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Teachers' Edition

Investigating School Mathematics

Extending
the Ideas

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PHARES G. O'DAFFER

ROBERT E. EICHOLZ



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The lessons in this EXTENDING THE IDEAS booklet offer new approaches to and extensions of mathematical concepts presented in the student text as well as introduction of new topics. The animal of each particular unit of the student text (Unit A, rabbit) is often used in an example or in the first exercise to show the child what to do on each page.

Brief mathematical explanations and teaching suggestions are given at the top of each page. A table of contents and correlation with the student text pages are given on the inside back cover.

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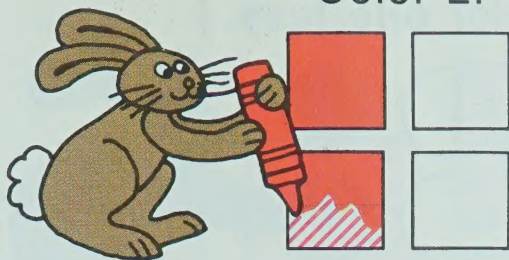
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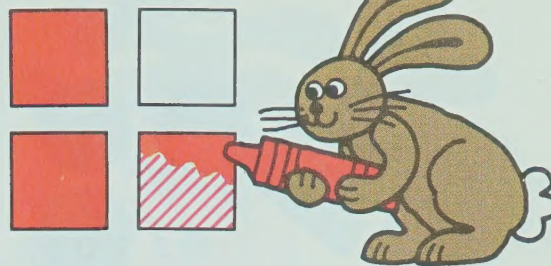
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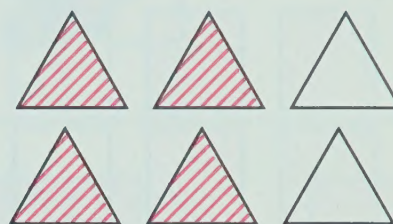
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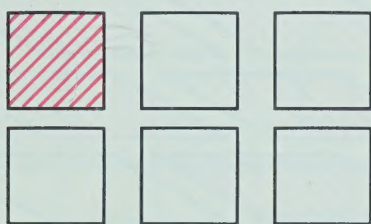
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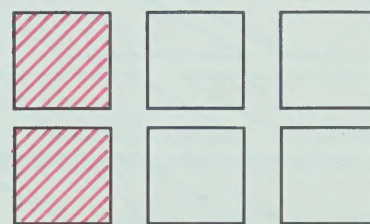
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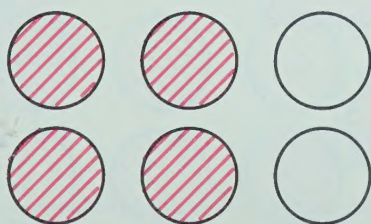
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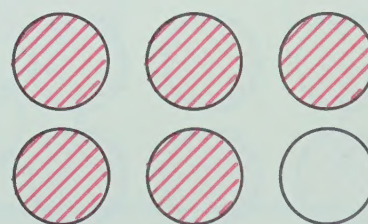
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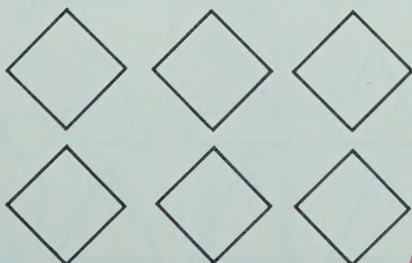
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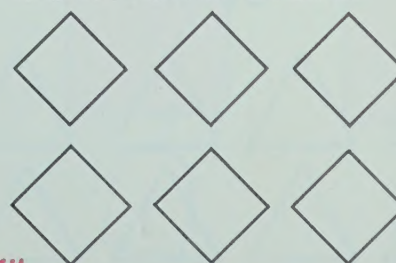
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Color ?



Color **one more**.

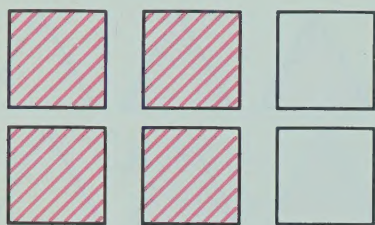
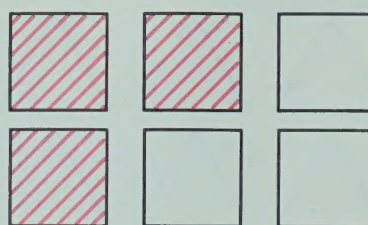


Answers will vary.

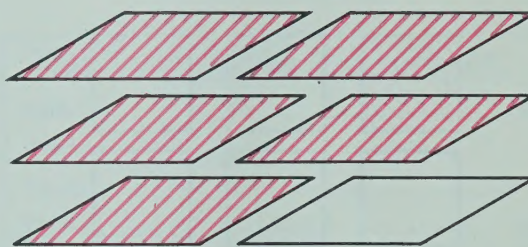
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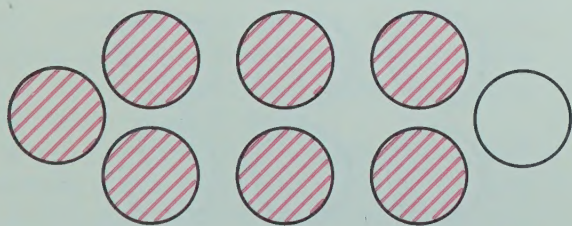
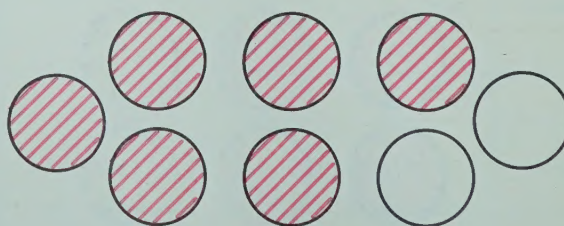
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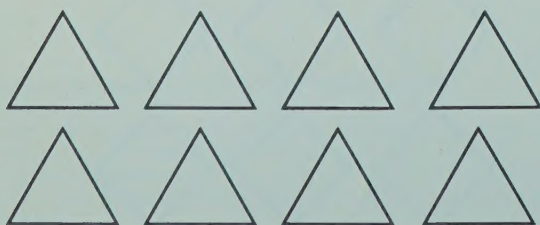
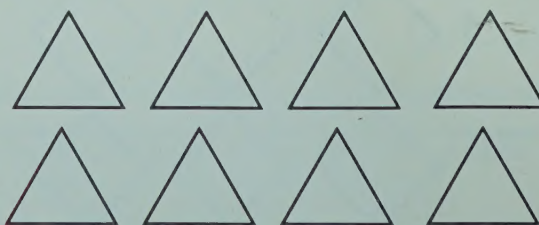
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Color 7.

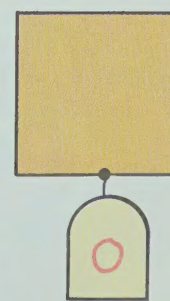
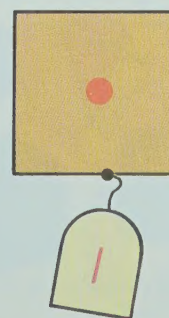
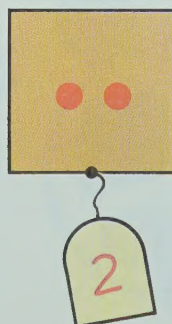
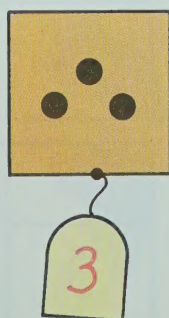
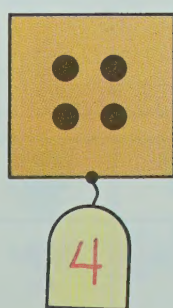
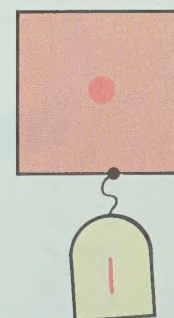
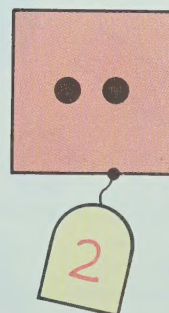
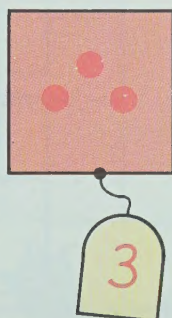
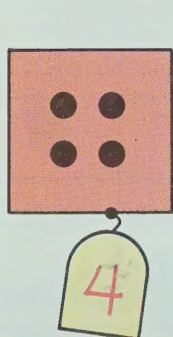
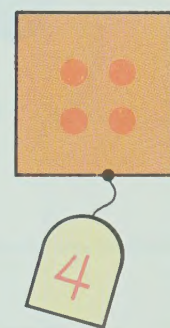
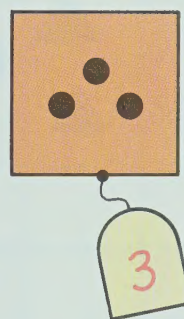
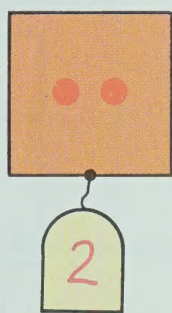
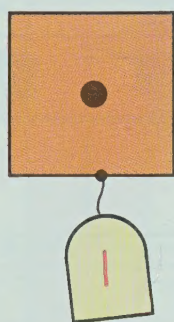
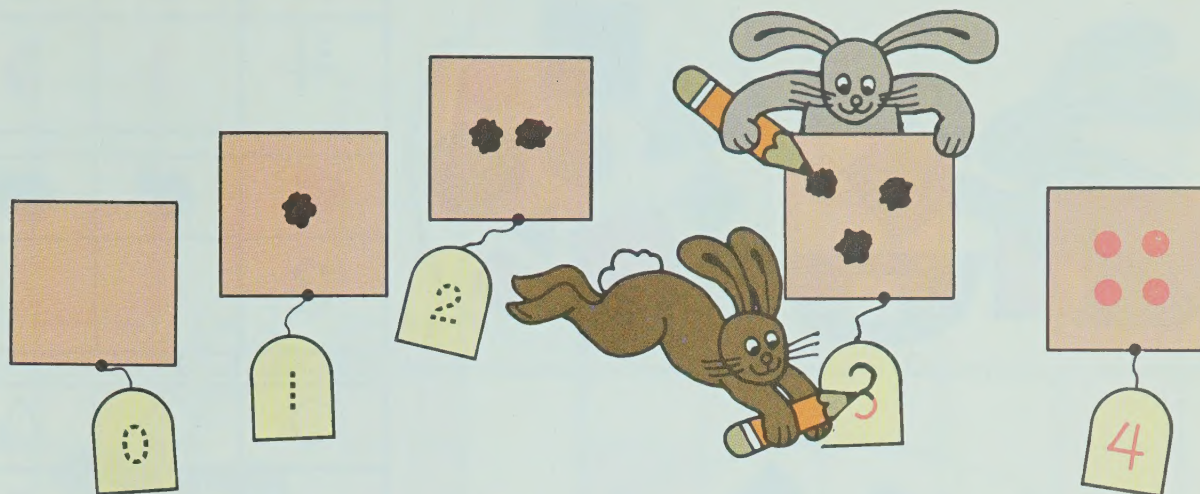
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Color ?

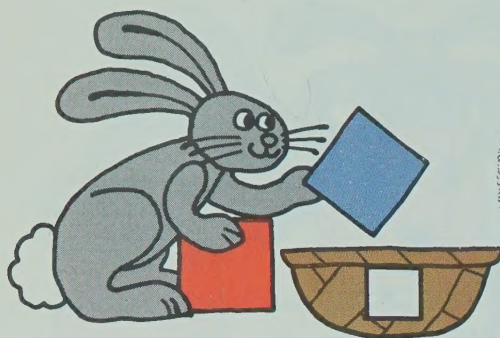
Color **one less**.

Answers
will
vary.

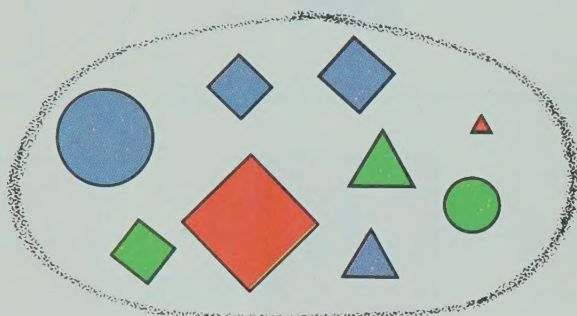
Draw the missing dots. Write the numeral.



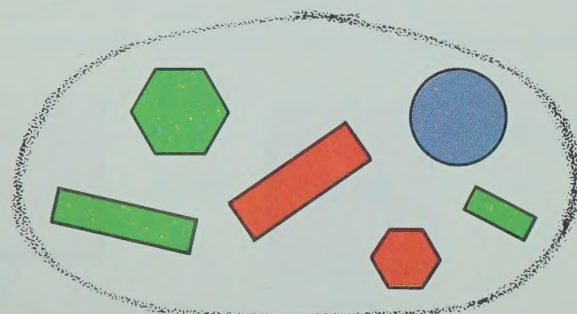
How many?



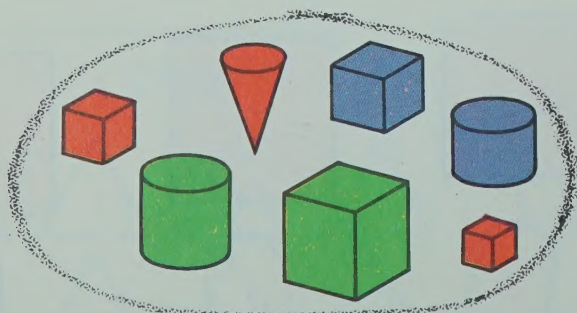
	3	2
	4	2



2	4	3
2	3	4



3	1	2
1	2	3



4	2	1
3	2	2

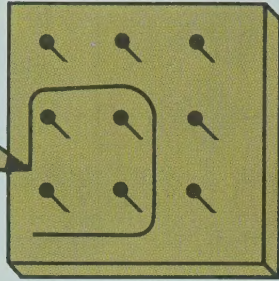
A graph is another mode of recording information. Have the children count the number of vegetables below the column of squares and then color the number of squares as there are vegetables.

Finish the graph.

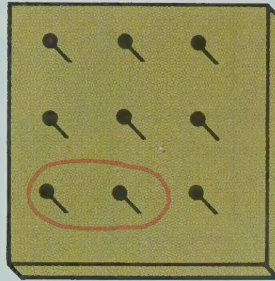


If nailboards (geoboards) and rubber bands are available, encourage children to pair off to continue the lesson in this manner: Have one ring some nails on the nailboard and the other indicate that number.

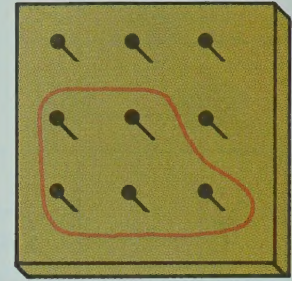
Ring the nails.



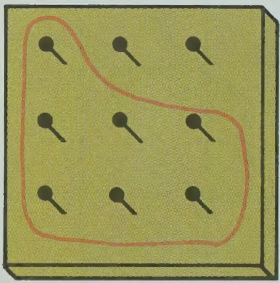
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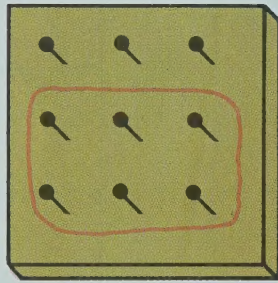
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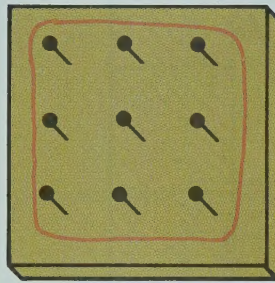
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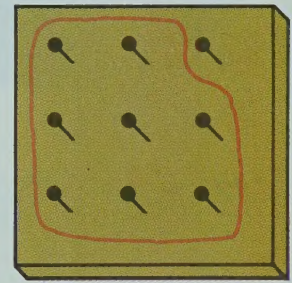
7



6

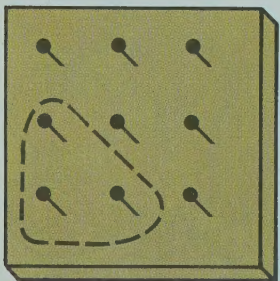


9

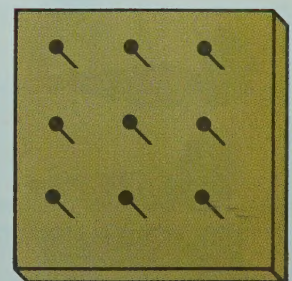
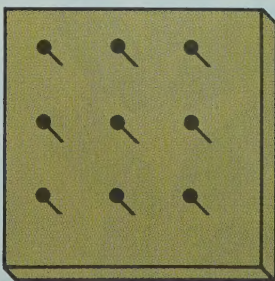
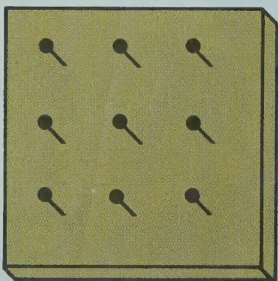


8

Ring some nails. How many did you ring? *Answers will vary.*



3



How many?



5 colored ●

4 not colored ○



7 colored ■

2 not colored □



6 colored ▲

3 not colored △

You color some. Then tell how many. *Answers will vary.*



_____ colored ●

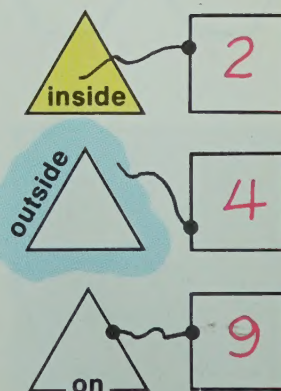
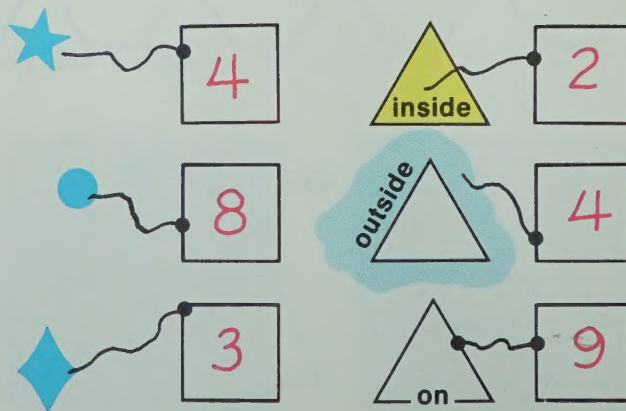
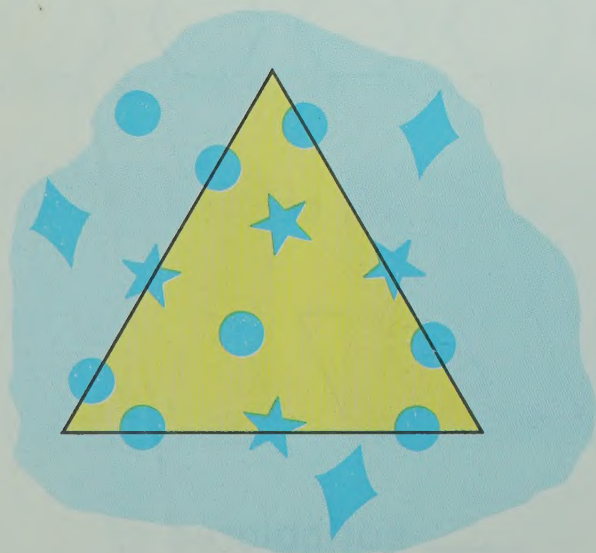
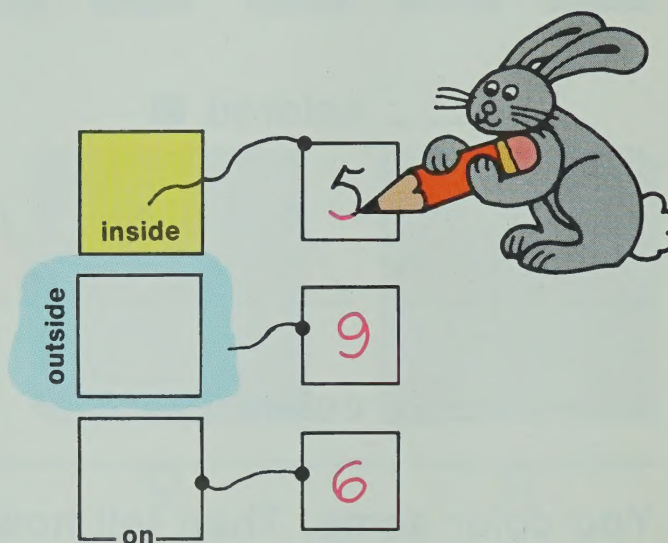
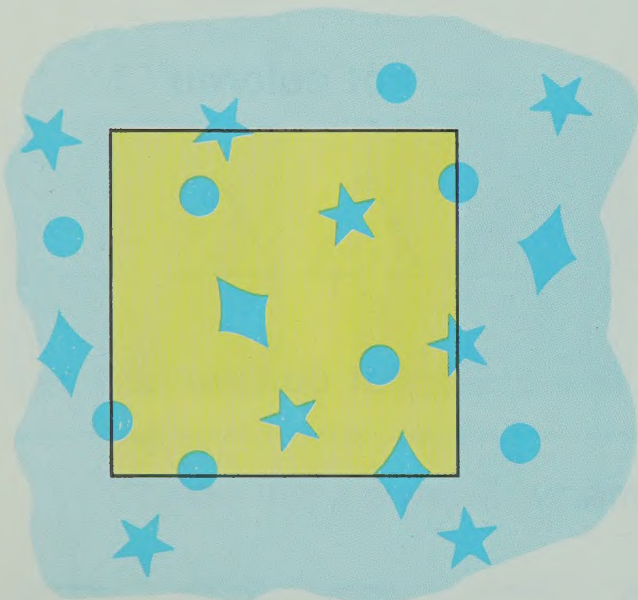
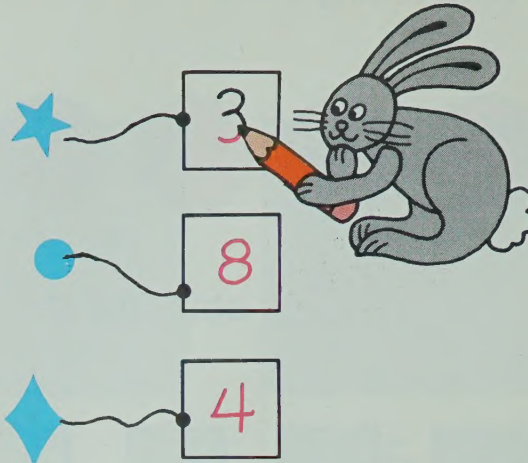
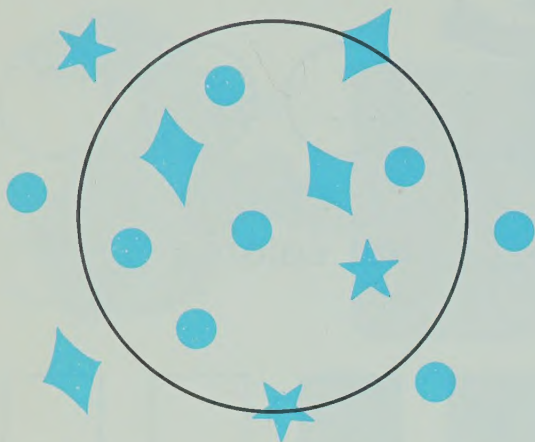
_____ not colored ○



_____ colored ▮

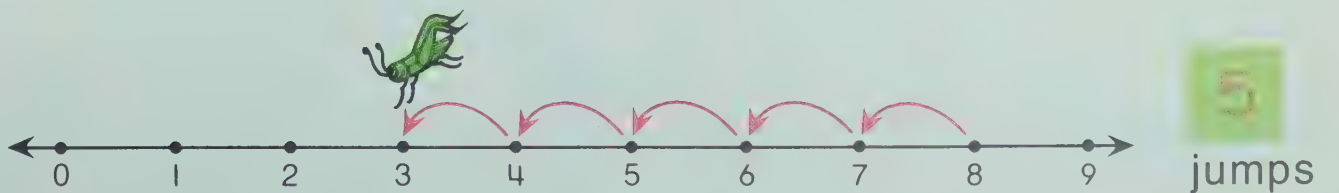
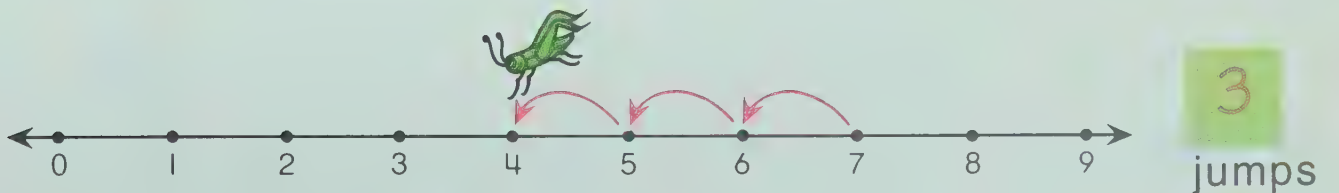
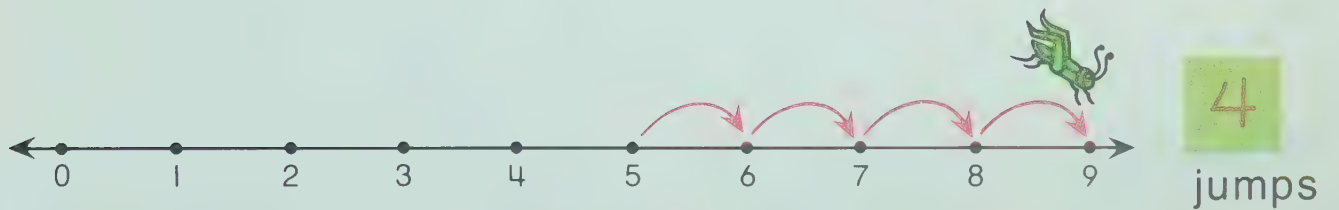
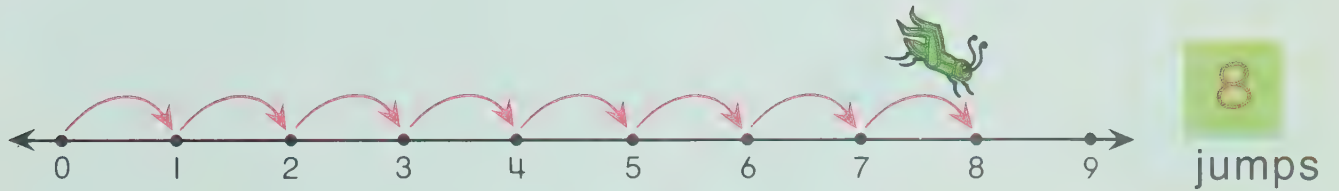
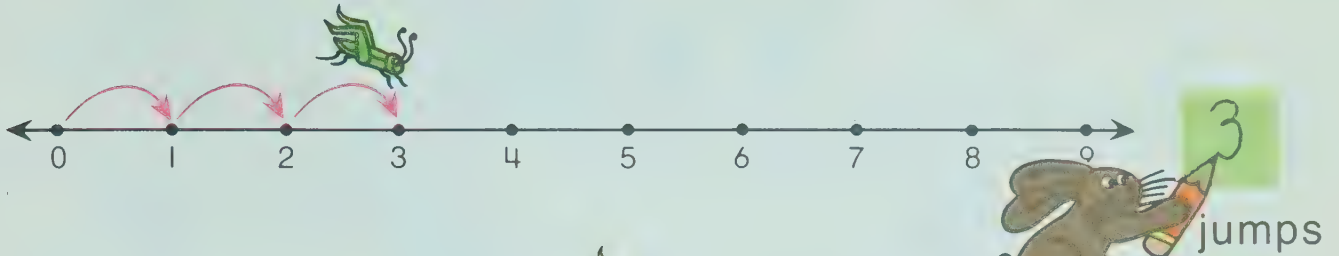
_____ not colored ▯

How many?



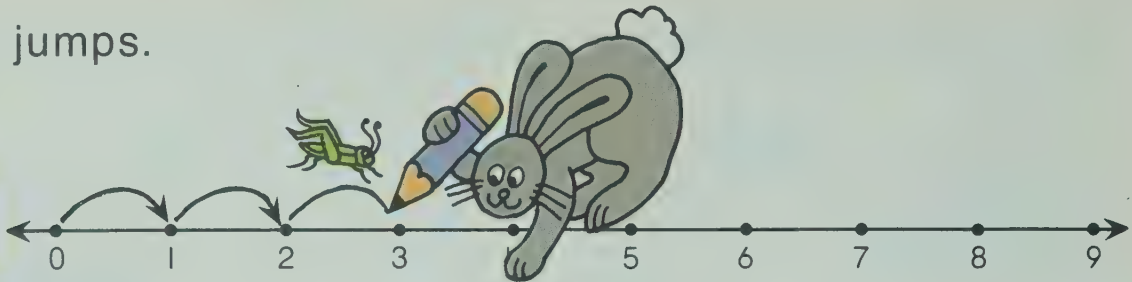
On this and the next page, the number line is used primarily as a physical device to show the order of the numbers 0 through 9. Note that the starting point is not always at 0. Thus, in the addition problems the number of jumps will not be the same as the number where the grasshopper stops.

How many jumps did the grasshopper make?



Draw the jumps.

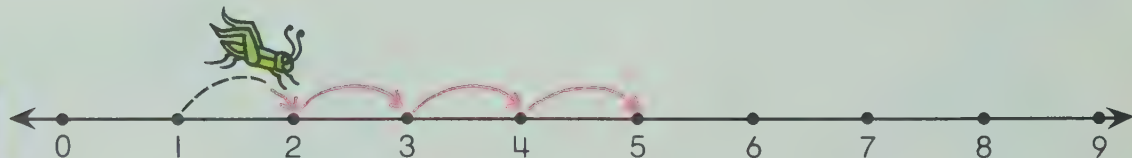
3 jumps



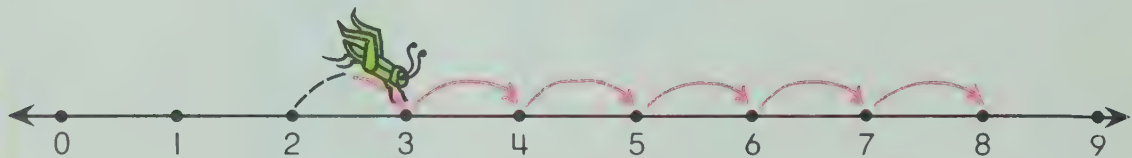
7 jumps



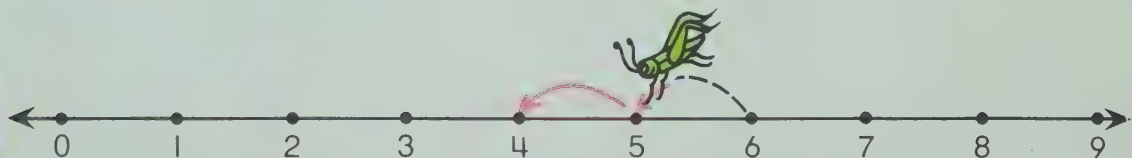
4 jumps



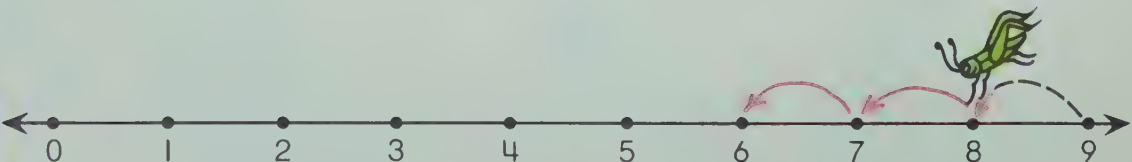
6 jumps



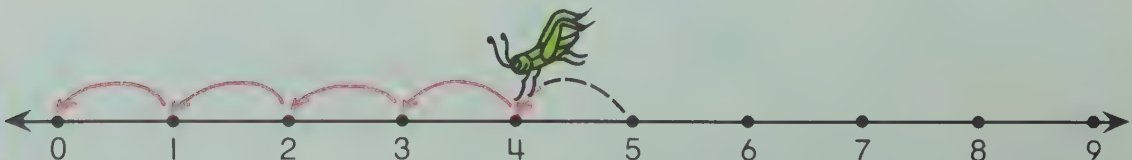
2 jumps



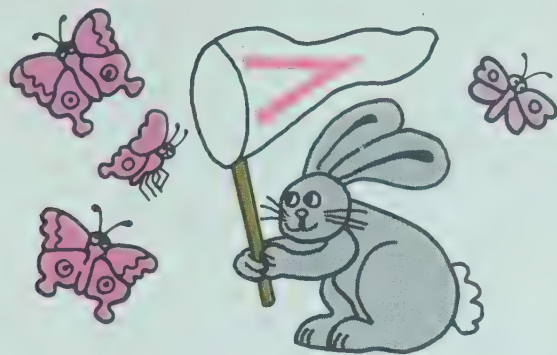
3 jumps



5 jumps



If children have difficulty with these problems, have them use sets of objects to find the relationship between each pair of numbers. Note that the symbol ($<$) points to the smaller number. Therefore, it is correct to say "2 is greater than 1" or "1 is less than 2" for $2 > 1$.



3 is greater than 1
 $3 > 1$



2 is less than 3
 $2 < 3$

Put $<$ or $>$ in each .

2 $>$ 1

5 $>$ 3

1 $>$ 0

5 $<$ 7

3 $<$ 5

4 $>$ 3

4 $<$ 6

8 $>$ 2

7 $<$ 9

6 $>$ 4

2 $<$ 8

4 $>$ 2

7 $>$ 0

6 $<$ 9

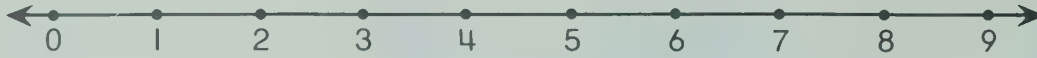
9 $>$ 8

0 $<$ 7

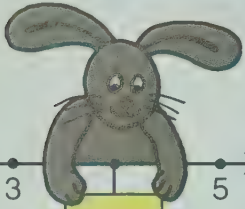
0 $<$ 4

7 $<$ 8

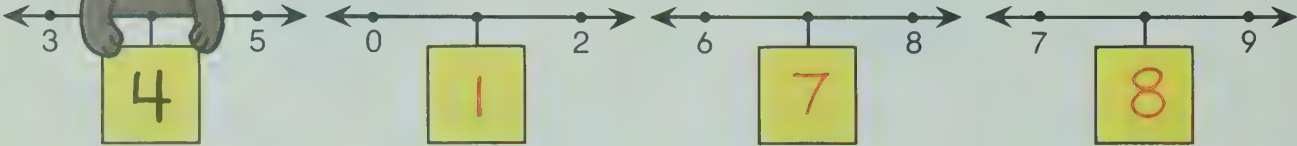
The position of the answer boxes on the short number-line pictures should give the child an idea of the terms *before*, *after*, and *between*. The number line at the top of the page should help the children fill in the boxes.



Write the numerals.



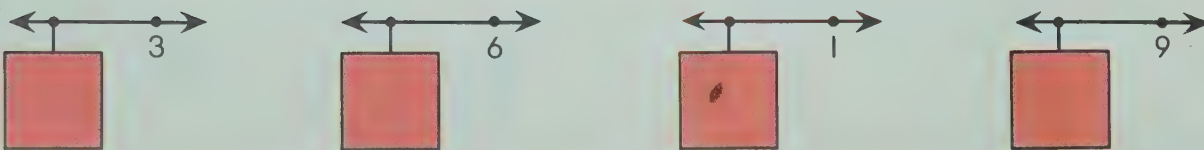
BETWEEN



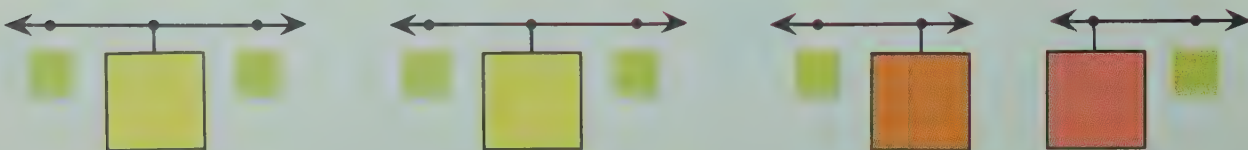
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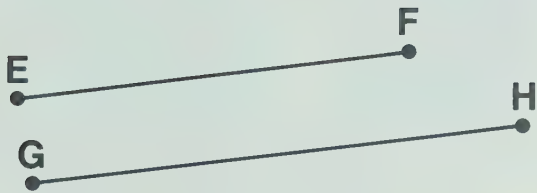
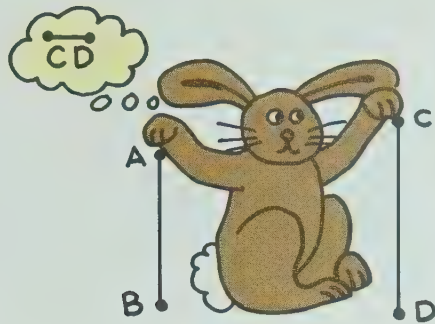
BEFORE



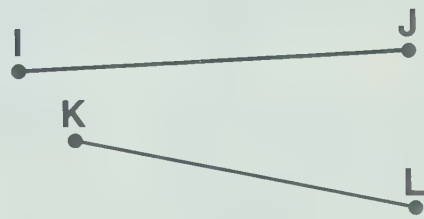
Make your own. Three consecutive numbers should be given for each part.



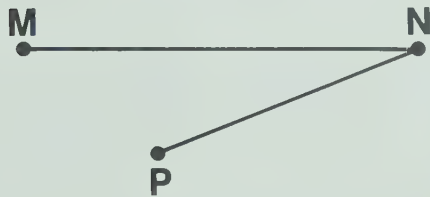
Which segment is longer?



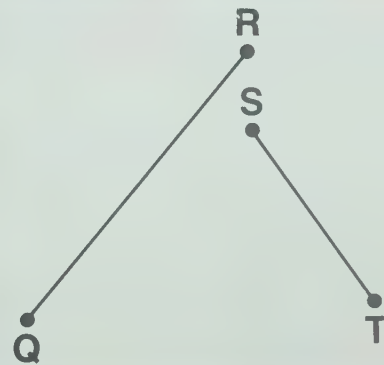
\overline{GH}



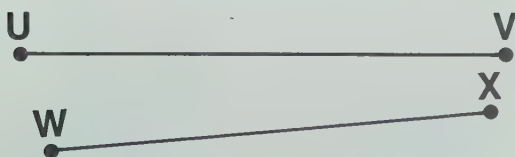
\overline{IJ}



\overline{MN}



\overline{QR}

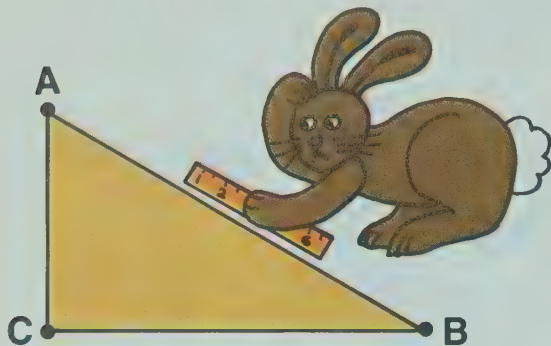


\overline{UV}



\overline{CD}

How many sides? Which side is the shortest?



3

sides



is the shortest.

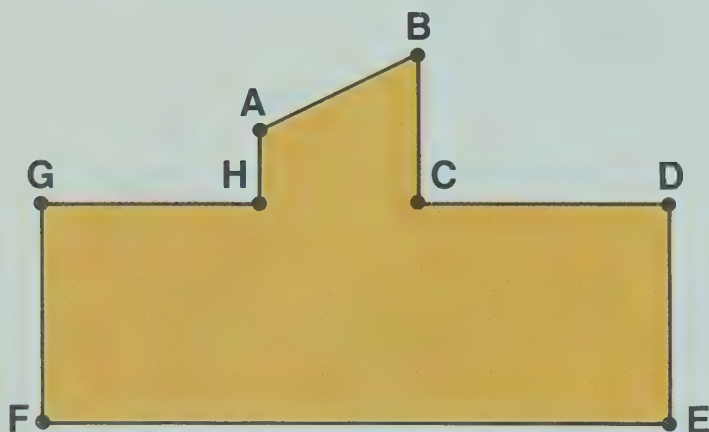


4

sides



is the shortest.



8

sides



is the shortest.

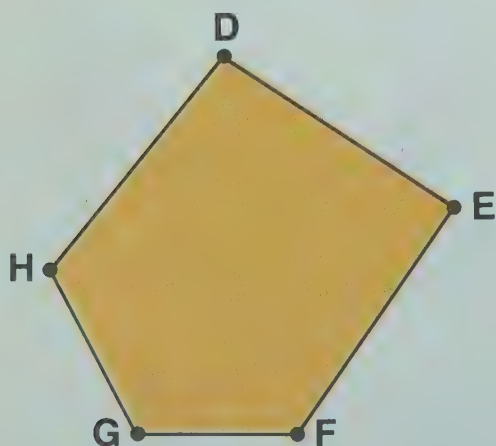


4

sides



is the shortest.

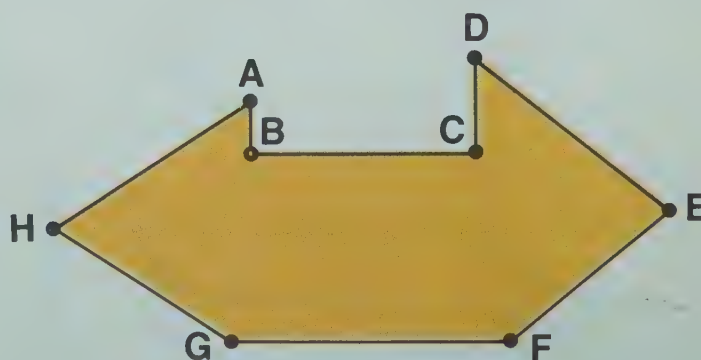


5

sides

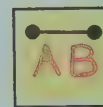


is the shortest.



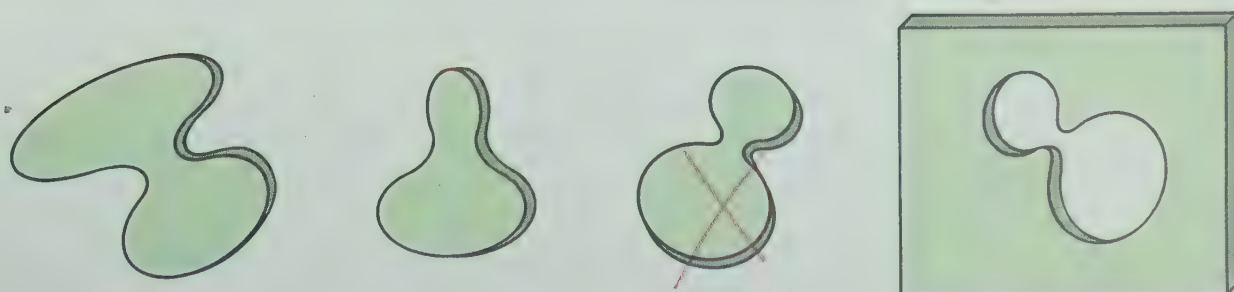
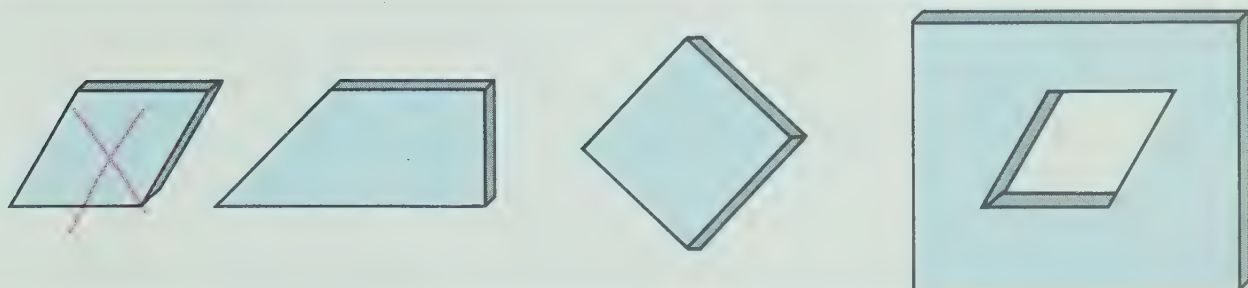
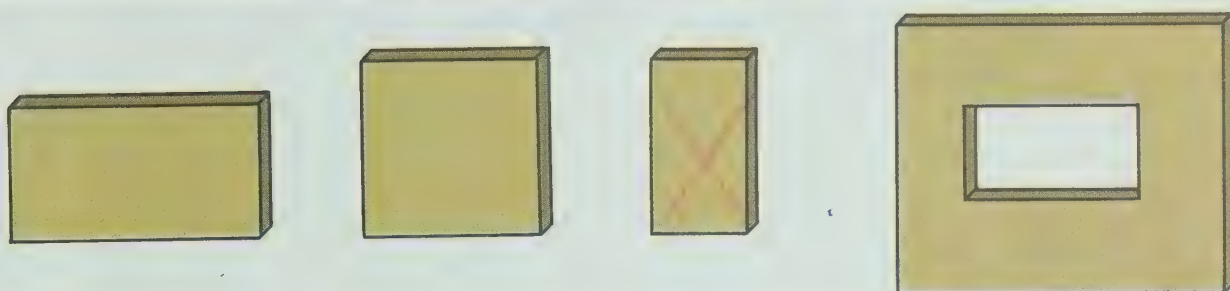
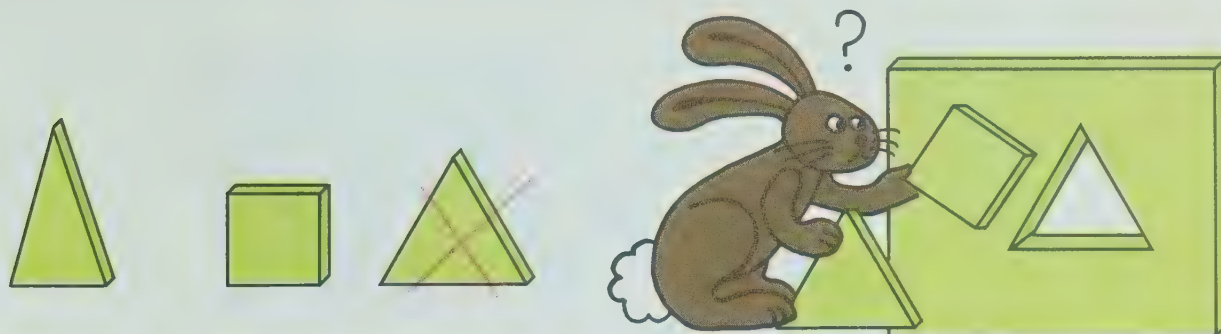
8

sides

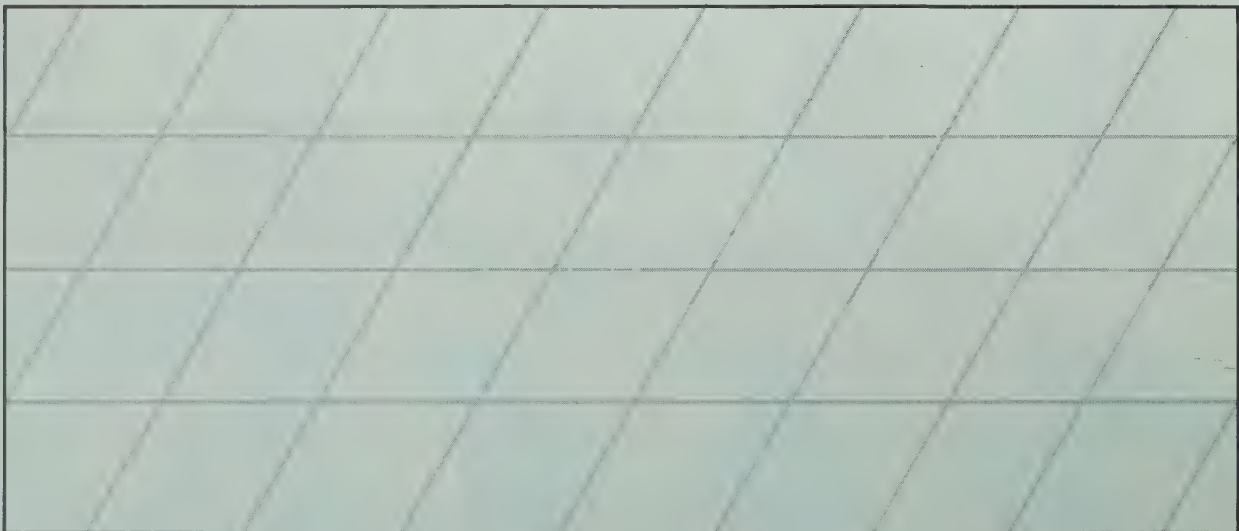
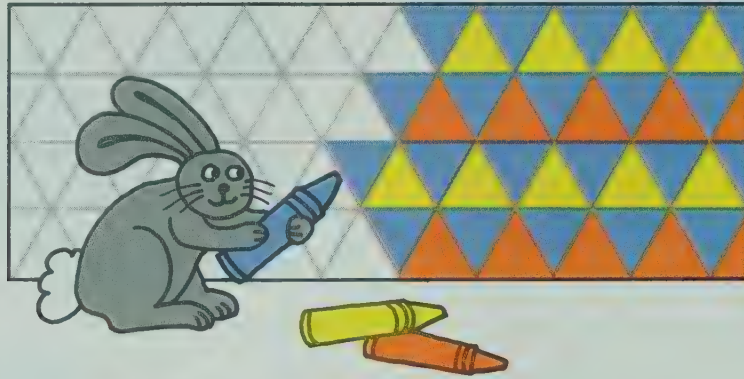


is the shortest.

Mark the figure that fits.

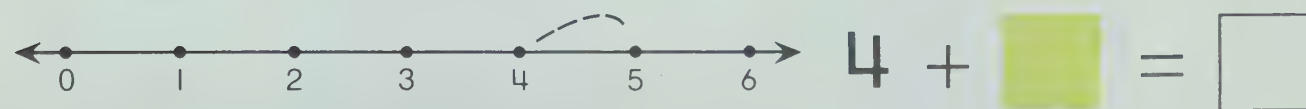
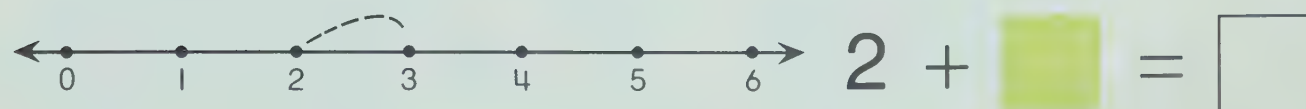
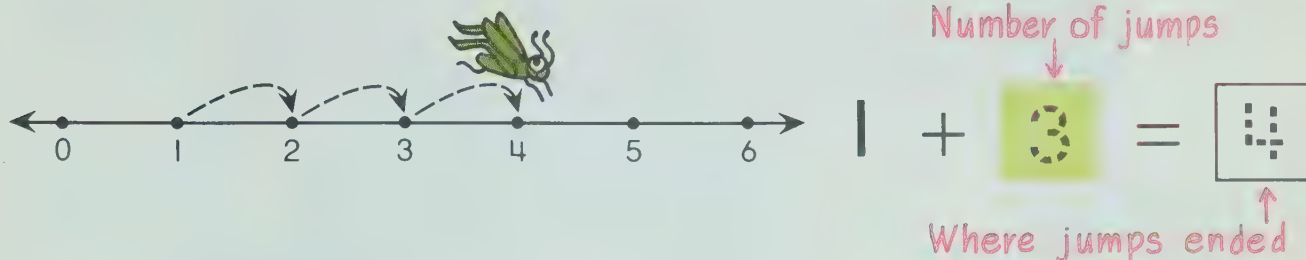


Make some designs of your own on the grids.



The number line is utilized here to help children make addition equations whose sums are 6 or less. The sum for each of their equations should be at the point where the grasshopper lands.

Draw some jumps. Complete the equation. *Answers will vary.*



Be sure children know the mechanics of filling out the addition table. Although the children have been working with sums through 5 thus far, encourage them to try to find as many sums as they can for the light green squares (sums of 6 through 10).

Complete the addition table.

+	0	1	2	3	4	5
0	0	1	$0 + 2$ 2	3	4	5
1	1	2	3	4	$1 + 4$ 5	6
2	2	$2 + 1$ 3	4	5	6	7
3	3	4	5	6	7	8
4	4	5	6	7	8	9
5	5	6	7	8	9	10

Note: A cartoon frog is sitting on the cell containing 5 (1+4), with a thought bubble saying $1 + 4 = 5$.

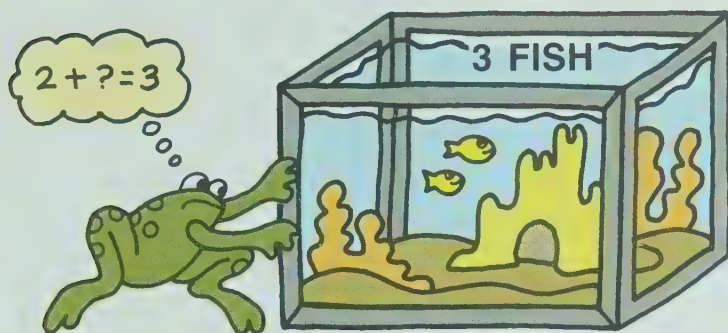
Find the sums.

1	2	3
3	2	5
4	4	8

0	2	2
3	4	7
3	6	9

The hide-and-seek method of introducing missing addends will help children to interpret the pictures and to solve the equations. For example, if there are three fish in the aquarium and you only see two of them, how many are hiding in the castle?

How many fish are in the castle?
Solve the equations.



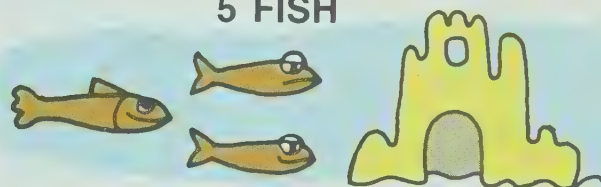
$$2 + \boxed{1} = 3$$

2 FISH



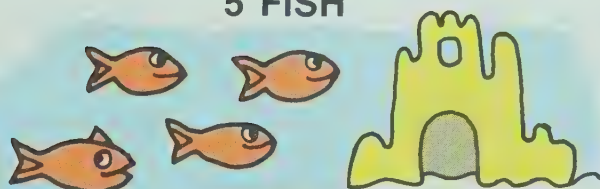
$$1 + \boxed{1} = 2$$

5 FISH



$$3 + \boxed{2} = 5$$

5 FISH



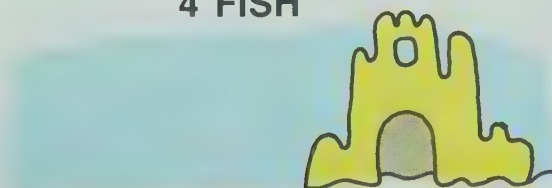
$$4 + \boxed{1} = 5$$

4 FISH



$$1 + \boxed{3} = 4$$

4 FISH



$$0 + \boxed{4} = 4$$

3 FISH



$$1 + \boxed{2} = 3$$

Continue to use the hide-and-seek method, if necessary. Otherwise, simply have the children ask questions about the equations. For example, for $3 + \square = 4$, ask "3 plus what number is 4?"

Solve the equations.

$$2 + \square = 4$$



$$\square + 1 = 3$$

$$0 + \square = 3$$

$$\square + 1 = 4$$

$$2 + \square = 5$$

$$\square + 2 = 5$$

$$0 + \square = 2$$

$$2 + \square = 3$$

$$\square + 0 = 3$$

$$4 + \square = 5$$

$$\square + 2 = 2$$

$$1 + \square = 5$$

$$\square + 0 = 1$$

$$\square + 3 = 3$$

Solve.

1	3	2	3	4	3
+ 2	+ 1	+ 3	+ 1	+ 0	+ 2
<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
3	4	5	4	4	5

Draw some jumps. Complete the equation. *Answers will vary.*

Number of jumps
↓

Where jumps ended
↑

$$5 - 2 = 3$$

$$3 - \square = \square$$

$$4 - \square = \square$$


$$2 - \square = \square$$

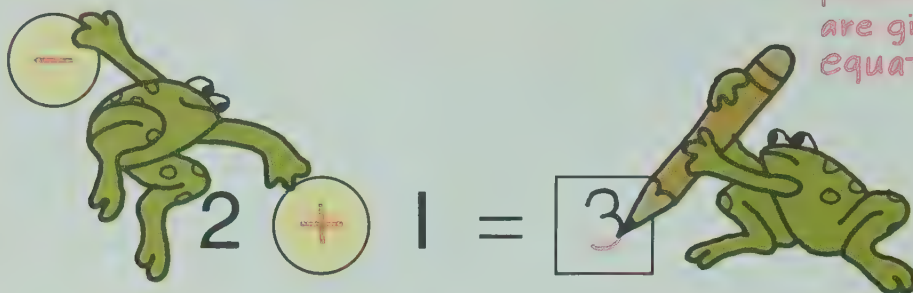
$$5 - \square = \square$$

$$4 - \square = \square$$

$$6 - \square = \square$$

Suggest that the children copy the equations on another piece of paper and put the other mathematical symbol in the circle. Then find that sum or difference.

Write + or - in each . Then solve the equation. *Both possible answers are given for each equation.*



$$4 - 1 = 3 \quad +, 5$$

$$2 + 2 = 4 \quad -, 0$$

$$3 + 2 = 5 \quad -, 1$$

$$4 + 3 = 7 \quad -, 1$$

$$5 + 0 = 5 \quad -, 5$$

$$5 + 1 = 6 \quad -, 4$$

$$5 + 4 = 9 \quad -, 1$$

$$3 + 3 = 6 \quad -, 0$$

$$3 + 1 = 4 \quad -, 2$$

$$1 + 0 = 1 \quad -, 1$$

$$4 + 2 = 6 \quad -, 2$$

$$4 + 0 = 4 \quad -, 4$$

$$1 + 1 = 2 \quad -, 0$$

$$5 + 3 = 8 \quad -, 2$$

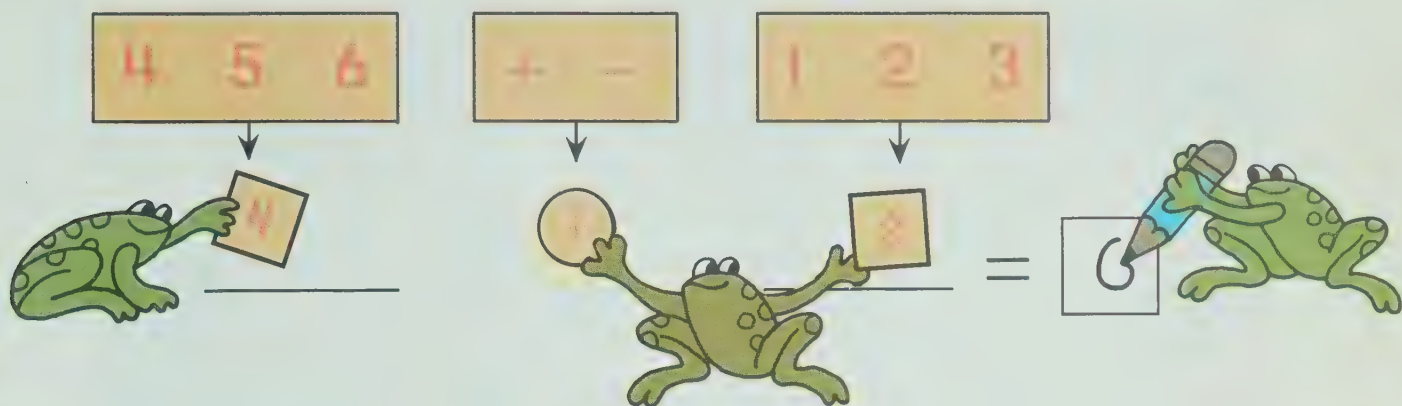
$$2 + 1 = 3 \quad -, 1$$

$$5 + 5 = 10 \quad -, 0$$

$$5 + 2 = 7 \quad -, 3$$

$$3 + 0 = 3 \quad -, 3$$

Make some equations of your own.



<u>4</u>	+	<u>1</u>	=	<u>5</u>
4	+	2	=	6
4	+	3	=	7
<u>4</u>	-	<u>1</u>	=	<u>3</u>
4	-	2	=	2
4	-	3	=	1
<u>5</u>	+	<u>1</u>	=	<u>6</u>
5	+	2	=	7
5	+	3	=	8
<u>5</u>	-	<u>1</u>	=	<u>4</u>
5	-	2	=	3
5	-	3	=	2
<u>6</u>	+	<u>1</u>	=	<u>7</u>
6	+	2	=	8
6	+	3	=	9
<u>6</u>	-	<u>1</u>	=	<u>5</u>
6	-	2	=	4
6	-	3	=	3

Although children have formally worked with sums through 7 thus far (white squares in table), suggest that they try to find as many sums as they can for the light blue squares (sums of 8 through 14).

Complete the addition table.

+	0	1	2	3	4	5	6	7
0	0	1	2	3	4	5	⁰⁺⁶ 6	7
1	1	2	3	4	¹⁺⁴ 5	6	7	8
2	2	3	4	5	6	7	8	9
3	3	4	5	6	³⁺⁷ 7	8	9	10
4	4	⁴⁺¹ 5	6	⁴⁺³ 7	8	9	10	11
5	5	6	7	8	9	10	11	12
6	6	7	8	9	10	11	12	13
7	7	8	9	10	11	12	13	14

Solve the equations.

$$5 + \boxed{2} = 7$$

$$3 + \boxed{4} = 7$$

$$4 + \boxed{2} = 6$$

$$5 + \boxed{1} = 6$$

Grade Ann's paper. Make a ✓ beside the mistakes.

Ann

$2 + 4 = 6$	$3 + 5 = 7$
$4 - 4 = 1$ ✓	$7 - 5 = 3$ ✓
$5 + 3 = 8$	$5 - 2 = 7$ ✓
$2 + 6 = 8$	$1 + 8 = 9$
$8 - 4 = 3$ ✓	$9 - 5 = 3$ ✓
$5 + 1 = 5$ ✓	$4 + 2 = 2$ ✓
$0 + 8 = 8$	$6 - 0 = 6$



Find the sum for each .

7	6	8	7
5	2	3	5
9	4	5	9
7	6	8	7

6	8	5	7
9	5	4	9
4	3	1	4
7	8	5	6

Write equations for 7.

$$\underline{3} + \underline{4} = 7$$

$$\underline{2} + \underline{5} = 7$$

$1+6=7$ $0+7=7$

$$7 - \underline{6} = \underline{1}$$

$$7 - \underline{5} = \underline{2}$$

$7-3=4$

$7-1=6$

$7-4=3$

$7-7=0$

$7-0=7$

Write equations for 8.

$$\underline{4} + \underline{4} = 8$$

$$\underline{5} + \underline{3} = 8$$

$$\underline{6} + \underline{2} = 8$$

$7+1=8$

$8+0=8$

$$8 - \underline{7} = \underline{1}$$

$$8 - \underline{2} = \underline{6}$$

$$8 - \underline{3} = \underline{5}$$

$8-0=8$

$8-4=4$

$8-5=3$

$8-6=2$

$8-1=7$

Write equations for 9.

$$\underline{4} + \underline{5} = 9$$

$$\underline{3} + \underline{6} = 9$$

$$\underline{2} + \underline{7} = 9$$

$$\underline{1} + \underline{8} = 9$$

$0+9=9$

$$9 - \underline{4} = \underline{5}$$

$$9 - \underline{5} = \underline{4}$$

$$9 - \underline{6} = \underline{3}$$

$$9 - \underline{7} = \underline{2}$$

$9-8=1$

$9-0=9$

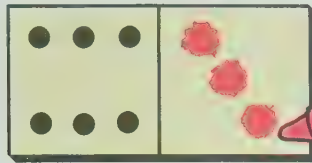
$9-2=7$

$9-9=0$

$9-1=8$

$9-3=6$

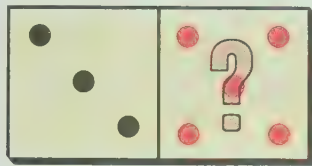
Solve the equations.



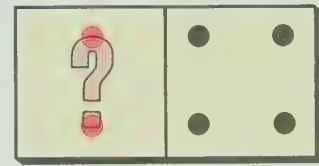
$$6 + \boxed{3} = 9$$



$$\boxed{2} + 5 = 7$$



$$3 + \boxed{5} = 8$$



$$\boxed{2} + 4 = 6$$

$$5 + \boxed{3} = 8$$

$$7 + \boxed{2} = 9$$

$$6 + \boxed{2} = 8$$

$$4 + \boxed{5} = 9$$

$$3 + \boxed{4} = 7$$

$$5 + \boxed{0} = 5$$

$$\boxed{1} + 7 = 8$$

$$\boxed{2} + 4 = 6$$

$$\boxed{4} + 5 = 9$$

$$\boxed{3} + 4 = 7$$

$$\boxed{3} + 6 = 9$$

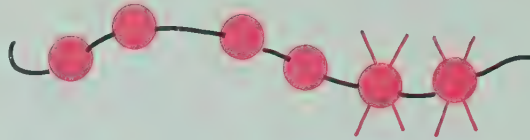
$$\boxed{7} + 1 = 8$$

Have the children observe the string of beads and the subtraction equation together. Tell them to cross out the beads until there is only the "difference" of them remaining. For example, for $4 - \square = 1$, cross out the beads until there is 1 left. Then go back and count how many were crossed out.

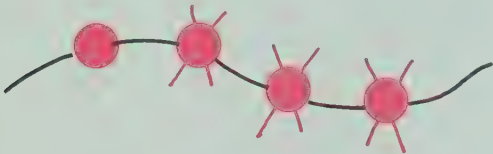
Solve the equations.



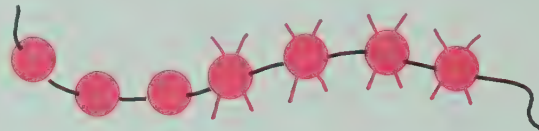
$$5 - \boxed{2} = 3$$



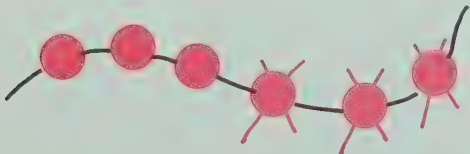
$$6 - \boxed{2} = 4$$



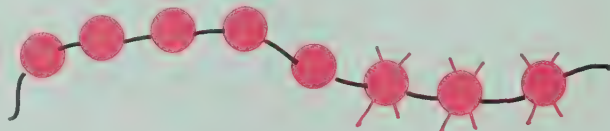
$$4 - \boxed{3} = 1$$



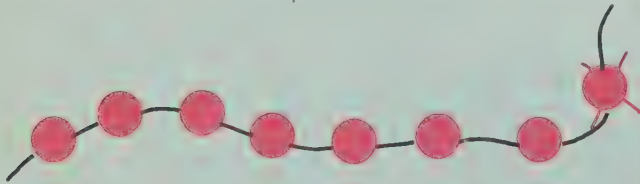
$$7 - \boxed{4} = 3$$



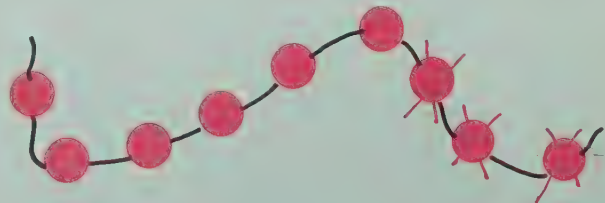
$$6 - \boxed{3} = 3$$



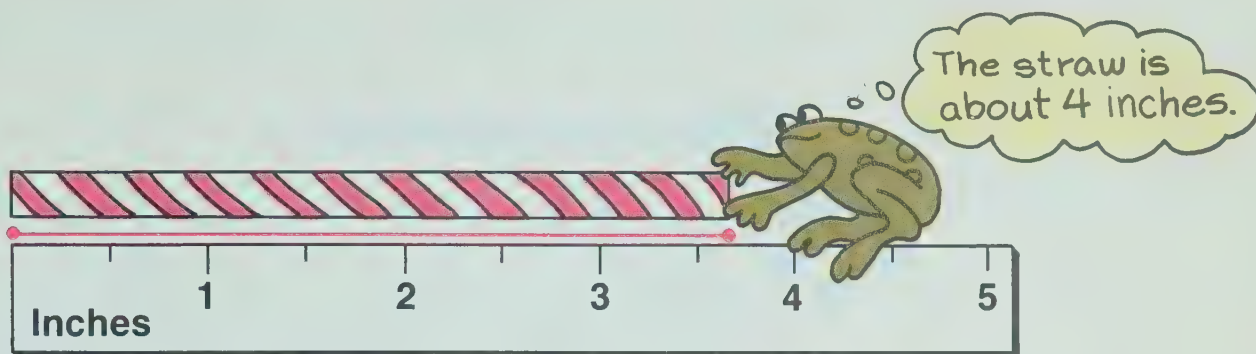
$$8 - \boxed{3} = 5$$



$$8 - \boxed{1} = 7$$



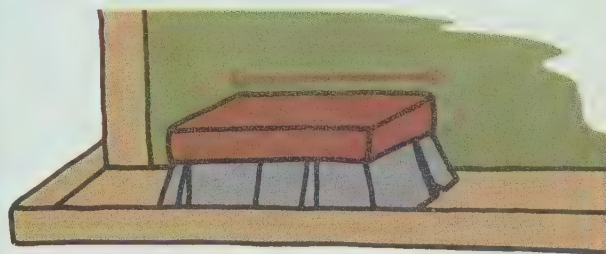
$$9 - \boxed{3} = 6$$



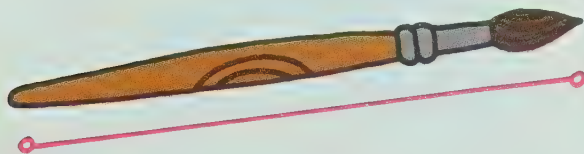
Find each object in your classroom. Then measure it to the nearest inch. *Answers will vary.*



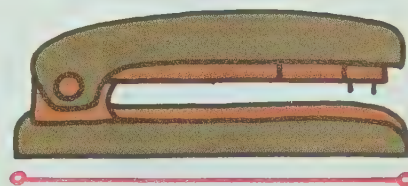
About inches.



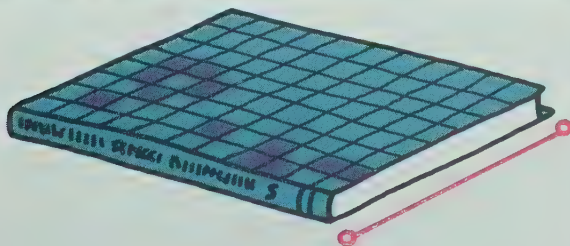
About inches.



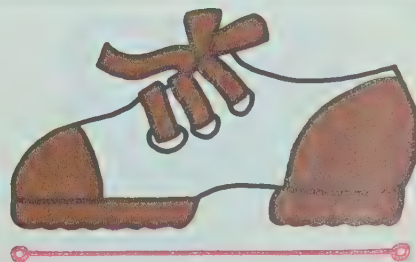
About inches.



About inches.

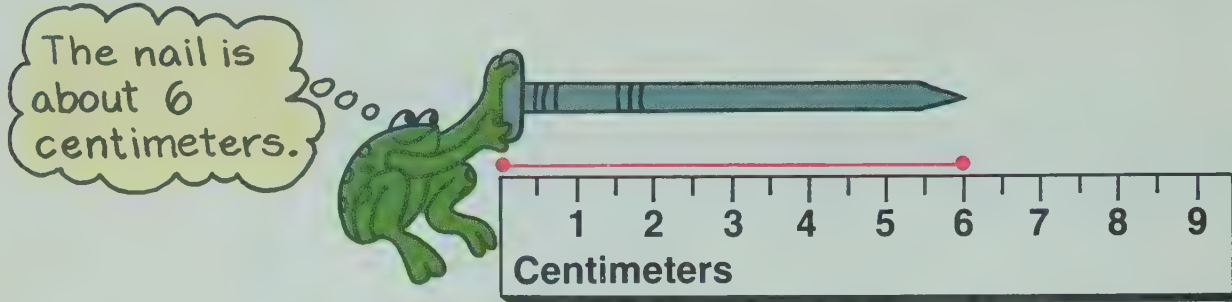


About inches.



About inches.

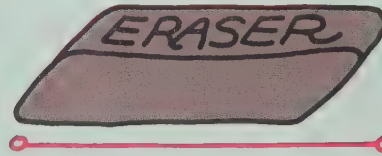
Children will soon realize that many of the objects they try to measure will not be an exact whole number of inches (or centimeters) in length. Therefore, direct them to give the number on the ruler that is nearest to the end of the object.



Find each object in your classroom. Then measure it to the nearest centimeter. *Answers will vary.*



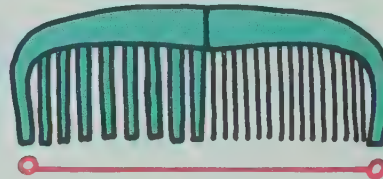
About centimeters.



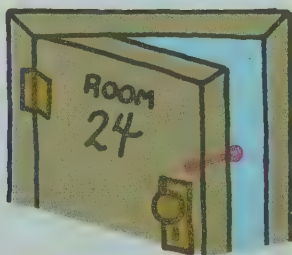
About centimeters.



About centimeters.



About centimeters.



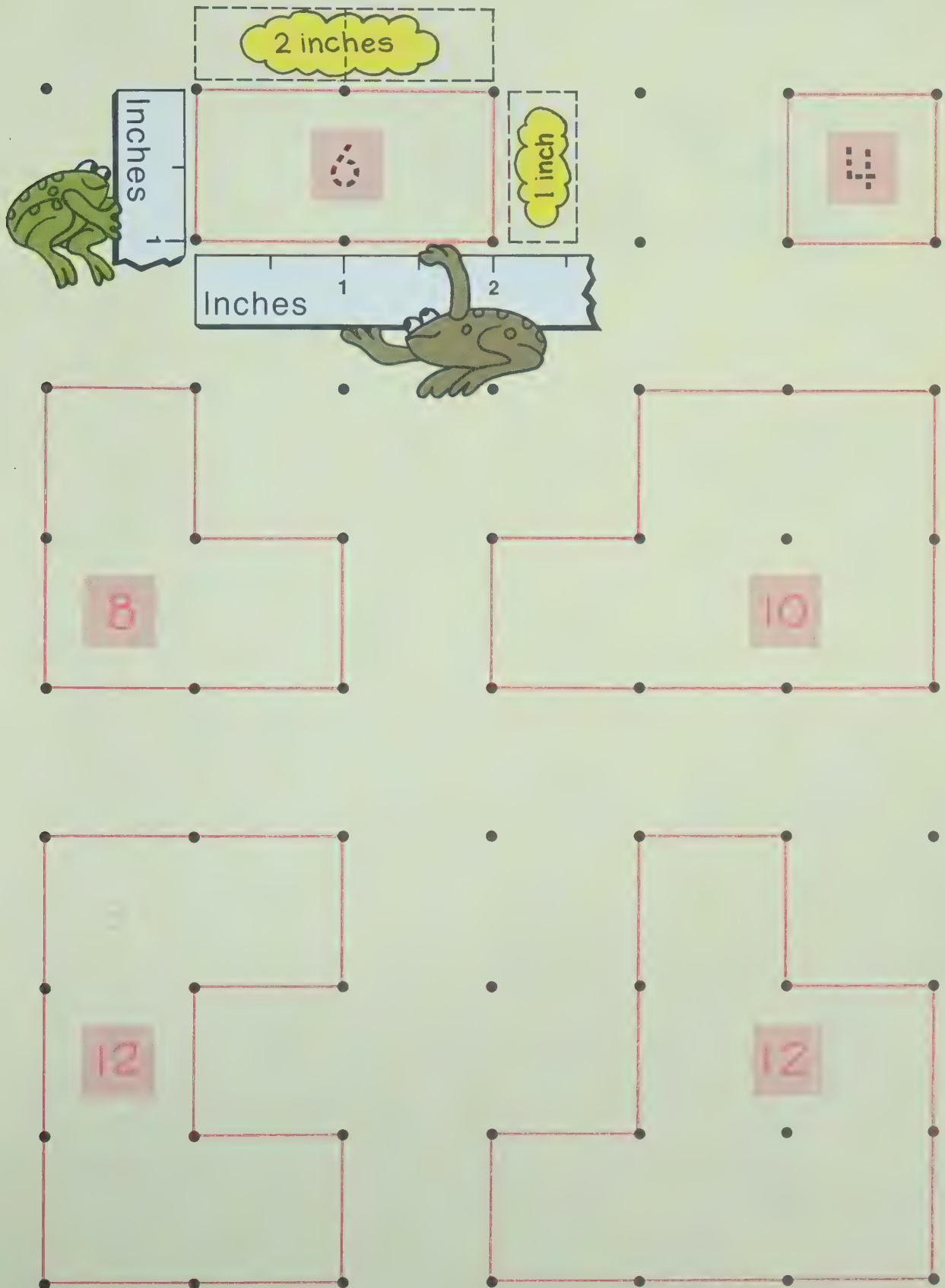
About centimeters.



About centimeters.

Perimeter is the sum of the lengths of the sides of a given polygon; or in simpler words, *the distance around a polygon*. The children may use inch rulers to measure the sides of each polygon or they may simply count the number of one-inch segments composing the outline of each figure.

How many inches is it around each figure?

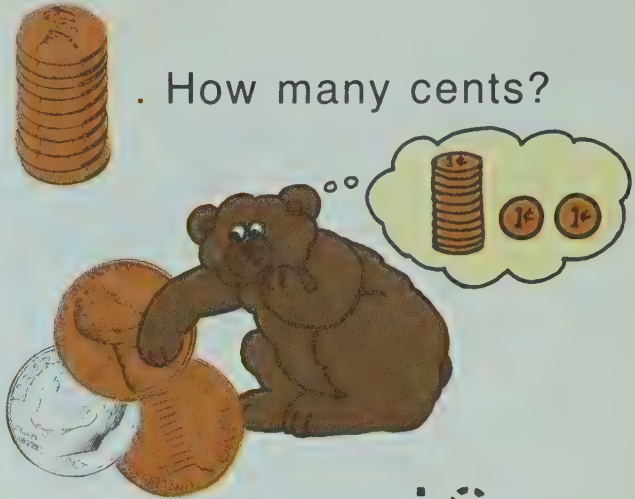
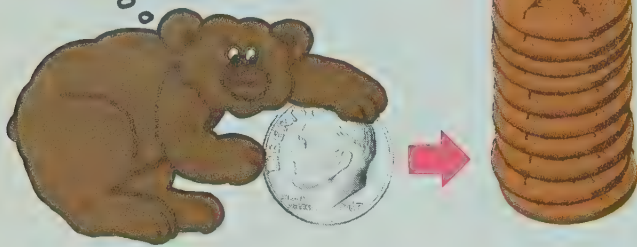


To increase enthusiasm in this lesson, create a banking atmosphere. Have children pair off into the roles of a teller and a customer. Provide play money to enable them to exchange dimes for pennies.

Trade dimes  for pennies

. How many cents?

1 dime is 10cents.



12 cents



14 cents



26 cents



34 cents



62 cents



80 cents



73 cents

How many?



Girls in the picture 12

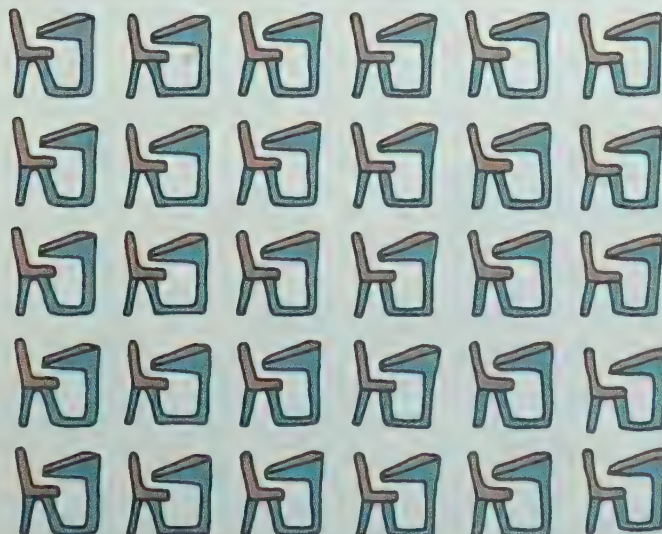
Girls in your room _____

Answers to second question in each frame will vary according to classroom situations.



Boys in the picture 15

Boys in your room _____

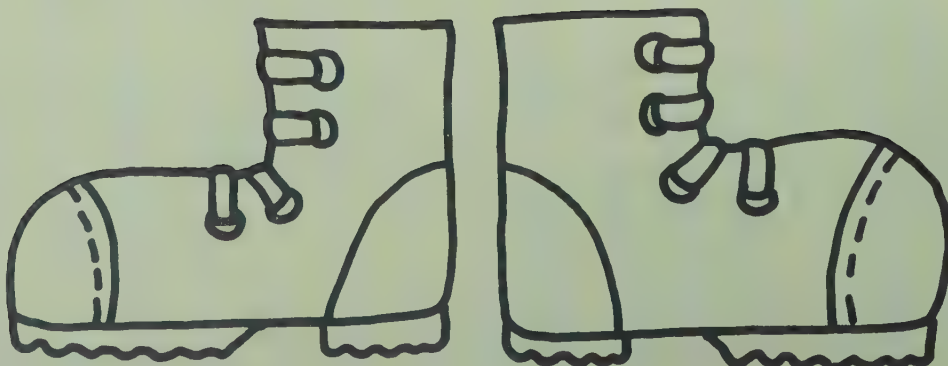
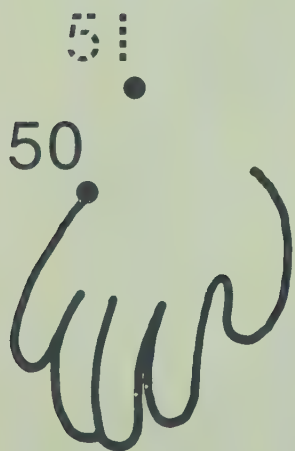
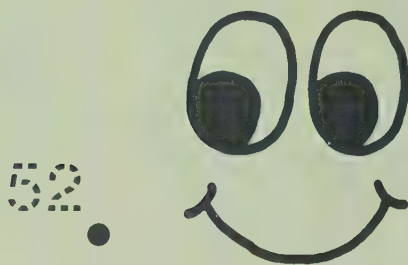


Desks in the picture 30

Desks (or chairs) in your room _____

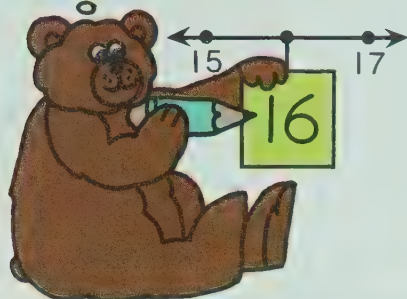
Urge the children to use as many dots and numerals as possible to make dot-to-dot picture puzzles of such things as a clown, an Indian chief, and so on. Then have the children exchange their puzzles.

Make a dot-to-dot picture puzzle. Mark the dots and write the numerals. Start at 50. *Answers will vary.*

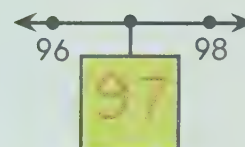
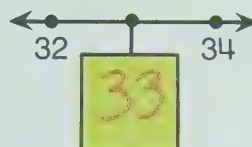


Write the numerals.

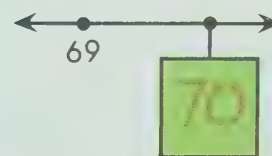
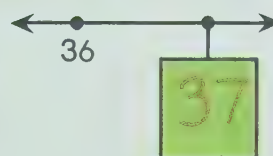
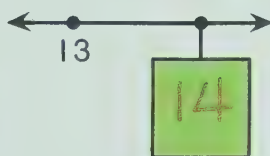
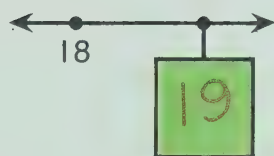
1, 2, 3, 4, ---
---15, 16, 17, ---



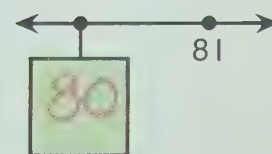
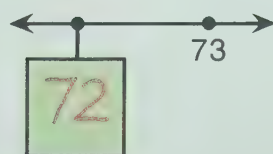
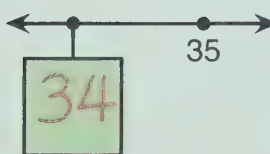
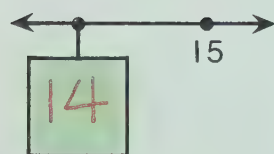
BETWEEN



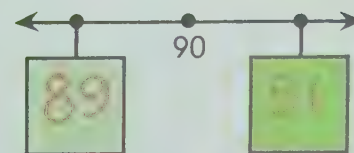
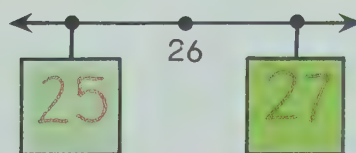
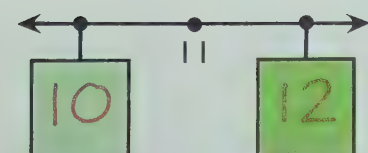
AFTER



BEFORE



BEFORE and AFTER



Complete each row.

0, 2, 4, 6, 8, 10, 12, 14, 16, 18

10, 20, 30, 40, 50, 60, 70, 80, 90, 100

5, 10, 15, 20, 25, 30, 35, 40, 45, 50

1, 3, 5, 7, 9, 11, 13, 15, 17, 19

11, 21, 31, 41, 51, 61, 71, 81, 91, 101

0, 3, 6, 9, 12, 15, 18, 21, 24, 27

5, 15, 25, 35, 45, 55, 65, 75, 85, 95

Put > or < in each .

20 > 10

30 < 40

29 > 28

26 > 16

32 < 42

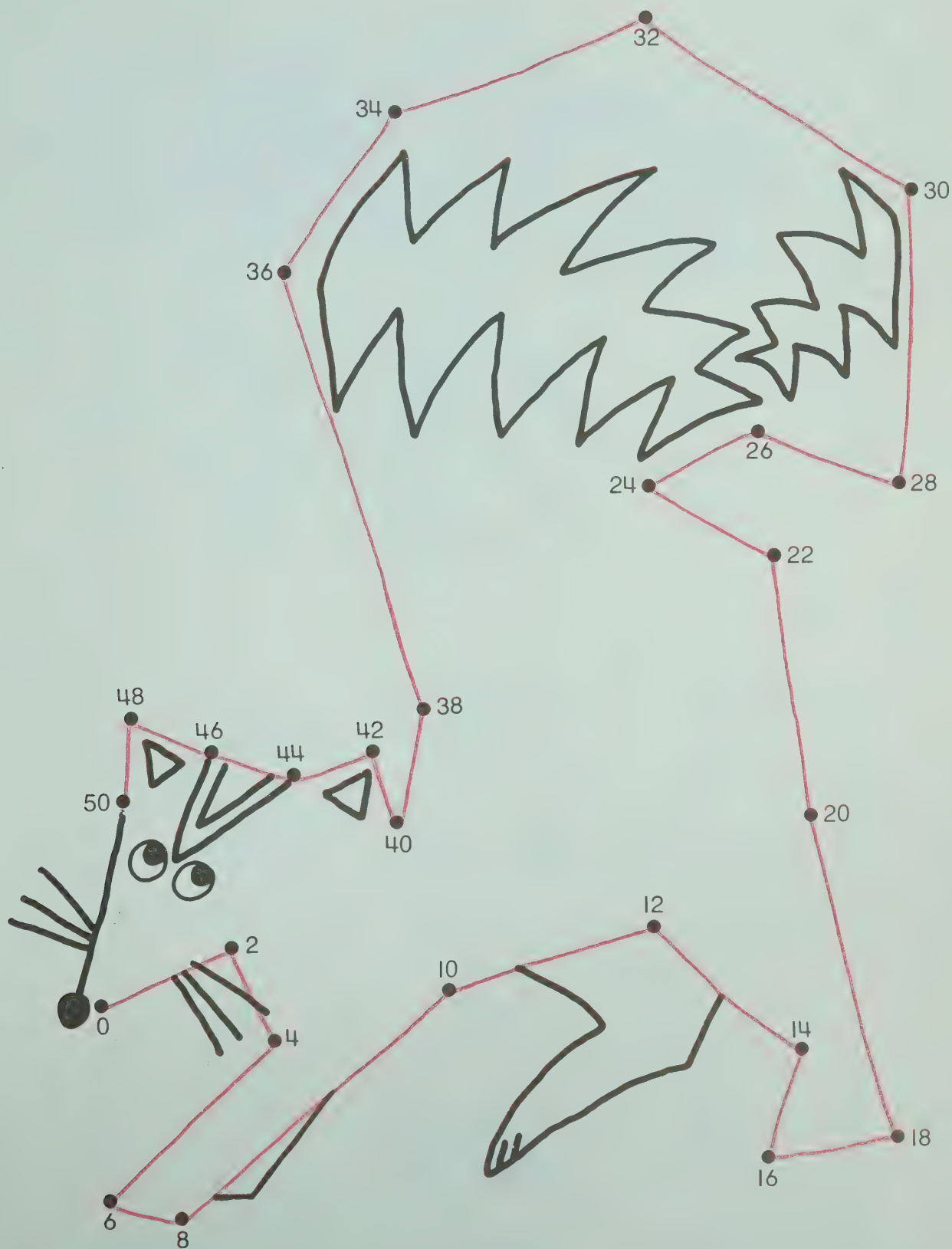
82 > 29

26 < 36

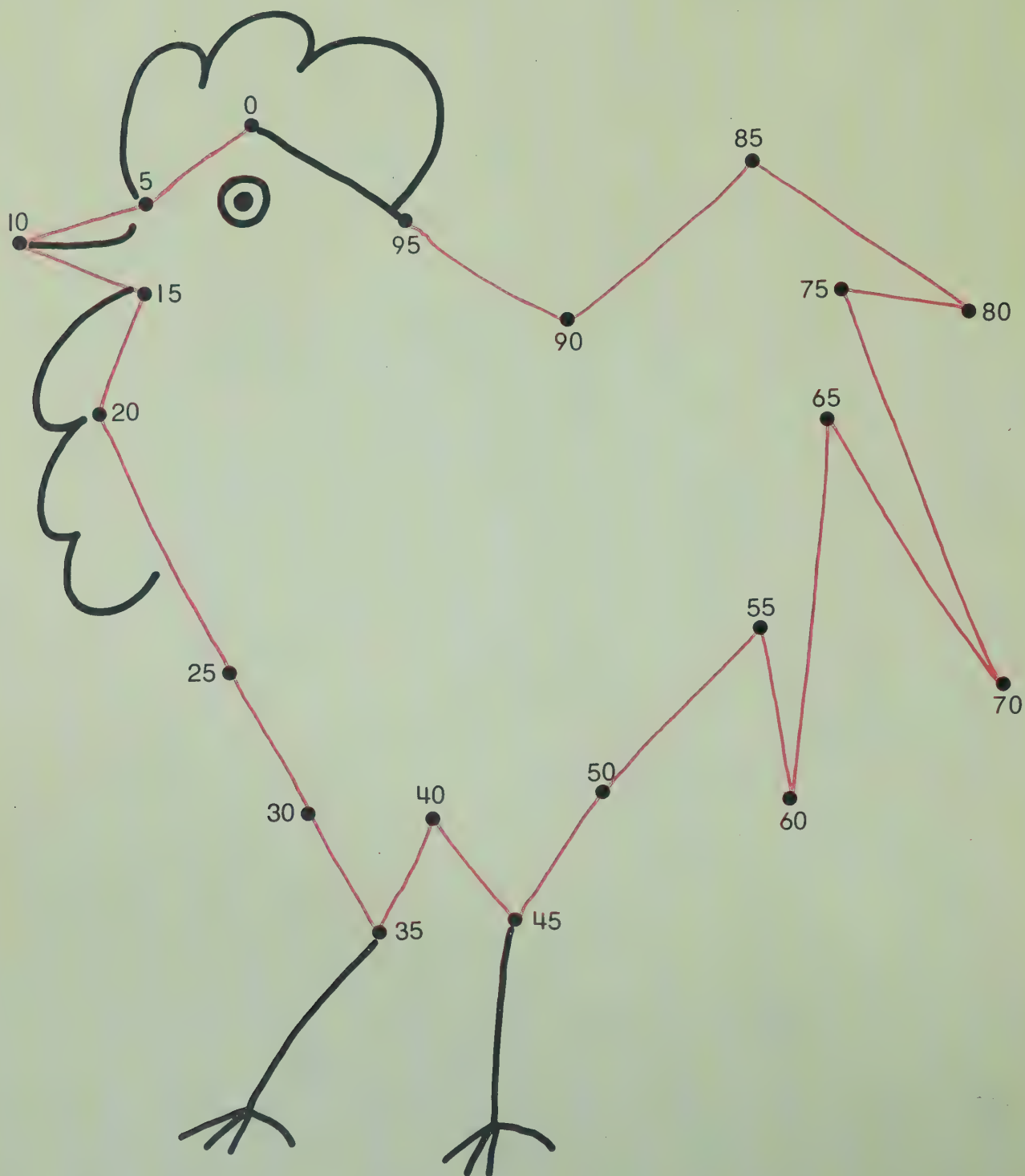
32 > 24

82 < 92

Connect the dots. Start at 0. Count by 2's.

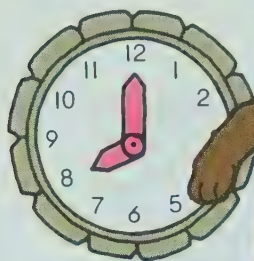


Connect the dots. Start at 0. Count by 5's.

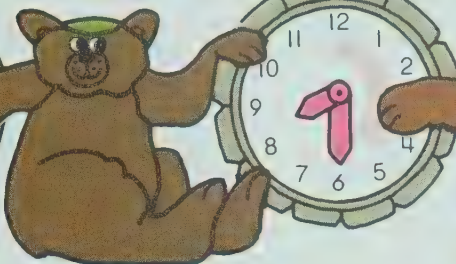


The children should be able to see that to get from 8 o'clock to *half past 8*, the minute hand rotated *halfway* around the clock. Permit children to use their punchout clocks to complete the exercises.

Put the minute hand on each clock.



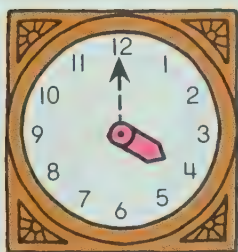
8 o'clock



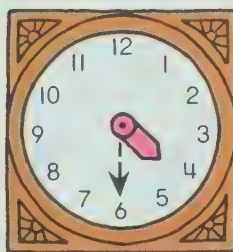
Half past 8



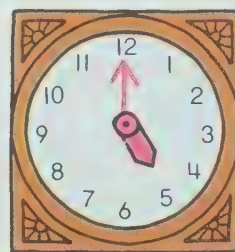
9 o'clock



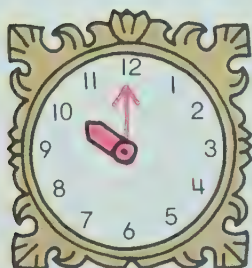
4 o'clock



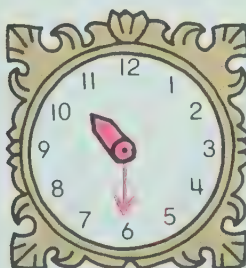
Half past 4



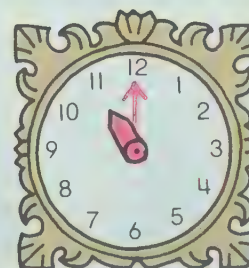
5 o'clock



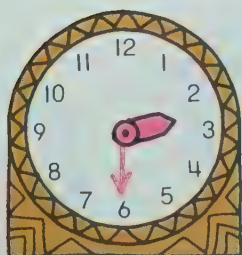
10 o'clock



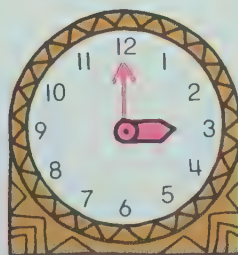
Half past 10



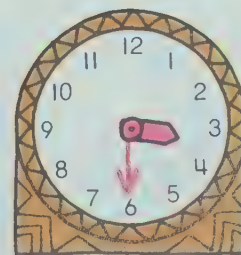
11 o'clock



Half past 2



3 o'clock

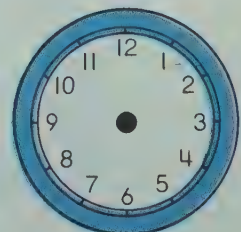
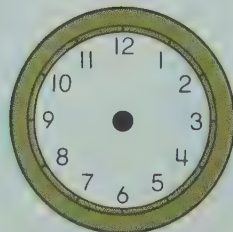
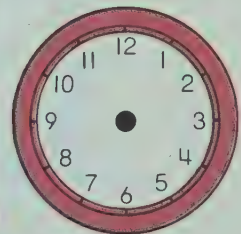
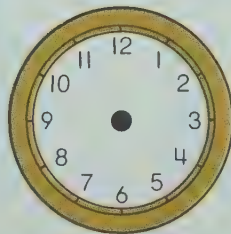
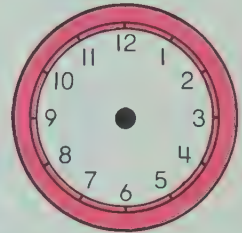
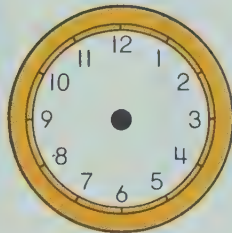
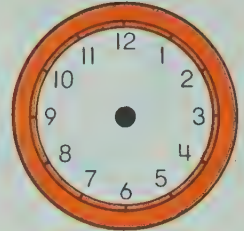
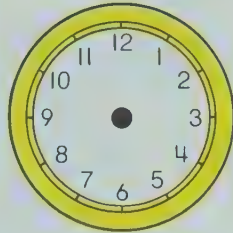


Half past 3

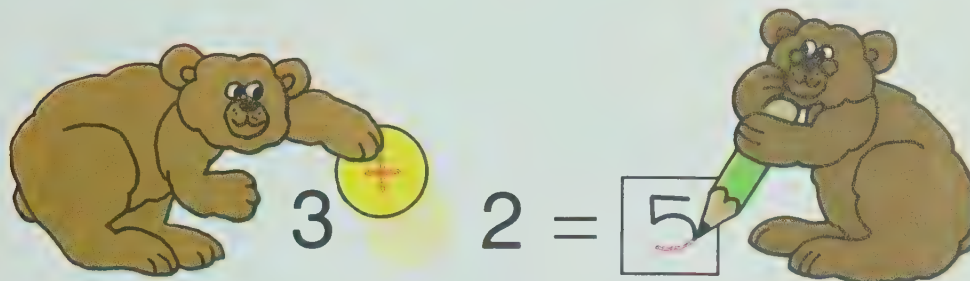
After the children have shown the times on the clock faces provided, ask them to respond orally as to what time their clocks show. Do this especially if they have indicated half hour and quarter hour times.

About what time does it happen?

Draw the hands on the clock. *Answers will vary.*



Put $+$ or $-$ in each \square . Then solve the equation.



$$5 \square 4 = \square \quad +, 9$$

$$6 \square 3 = \square \quad +, 9$$

$$7 \square 1 = \square \quad +, 8$$

$$9 \square 3 = \square \quad +, 12$$

$$5 \square 2 = \square \quad +, 7$$

$$7 \square 6 = \square \quad +, 13$$

$$8 \square 3 = \square \quad +, 11$$

$$6 \square 4 = \square \quad +, 10$$

Solve the equations.

$$4 + \square = 6$$

$$7 + \square = 9$$

$$\square + 4 = 8$$

$$\square + 3 = 9$$

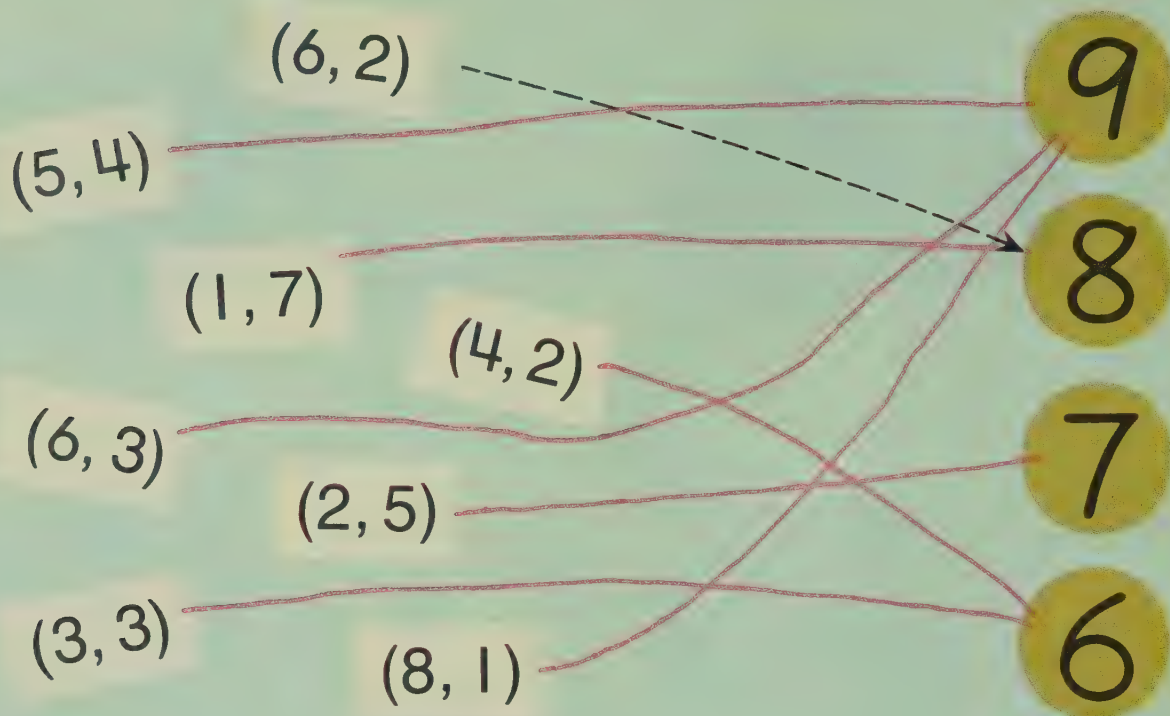
$$5 + \square = 5$$

$$\square + 3 = 7$$

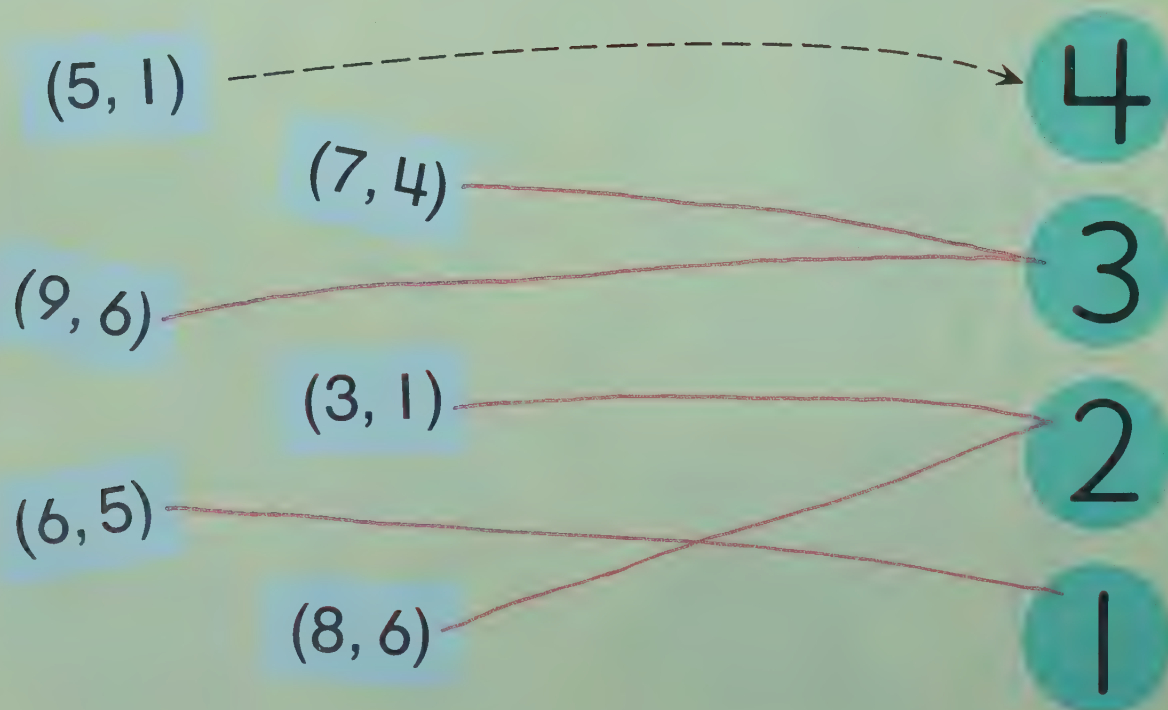
$$5 - \square = 3$$

$$8 - \square = 6$$

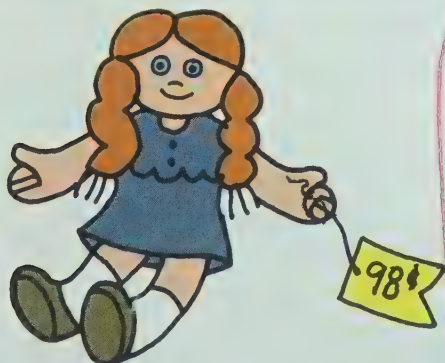
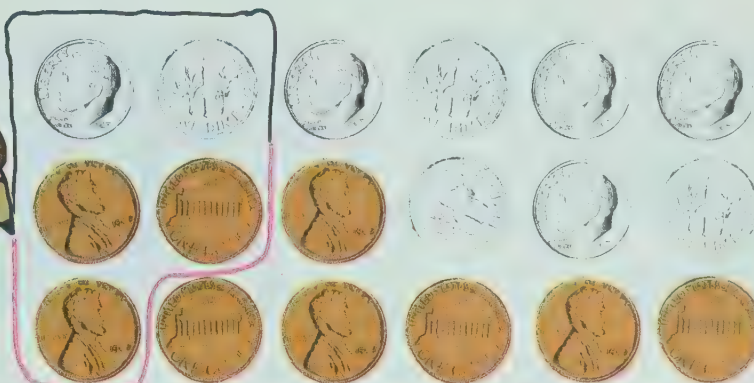
Find the sums.



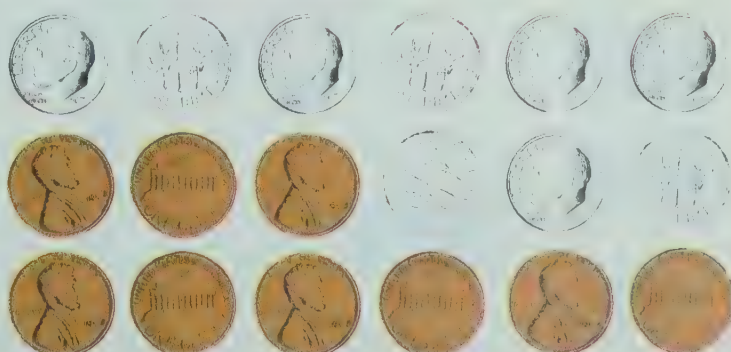
Find the differences.



How much money is needed?



YOUR CHOICE



Point out to the children that dollar-and-cent notation employs the dollar sign (\$) and a dot (decimal point). Do not elaborate on the decimal point. Indicate only that it separates the number of dollars from the number of cents.

How much money?

4 dollars
and 63 cents

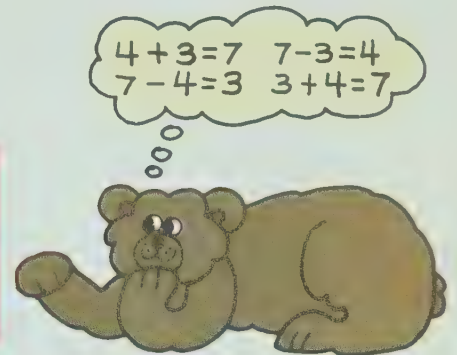
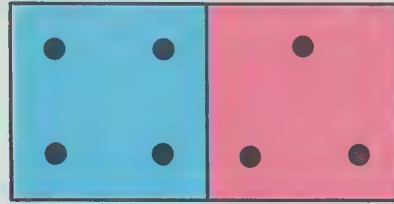
\$ 4 . 63
Dollars Cents

\$ 7 . 48
Dollars Cents

\$ 8 . 56
Dollars Cents

\$ 26 . 34
Dollars Cents

Write 4 equations.

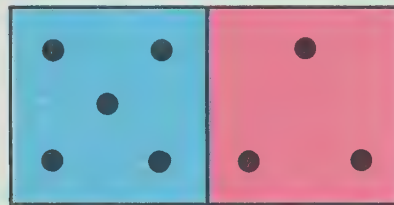


$$\underline{4} + \underline{3} = \underline{7}$$

$$\underline{3} + \underline{4} = \underline{7}$$

$$\underline{7} - \underline{4} = \underline{3}$$

$$\underline{7} - \underline{3} = \underline{4}$$

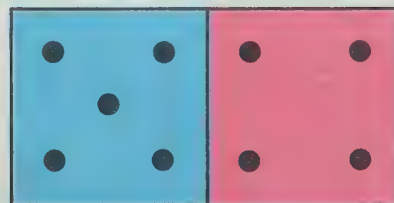


$$\underline{5} + \underline{3} = \underline{8}$$

$$\underline{3} + \underline{5} = \underline{8}$$

$$\underline{8} - \underline{5} = \underline{3}$$

$$\underline{8} - \underline{3} = \underline{5}$$



$$\underline{5} + \underline{4} = \underline{9}$$

$$\underline{4} + \underline{5} = \underline{9}$$

$$\underline{9} - \underline{5} = \underline{4}$$

$$\underline{9} - \underline{4} = \underline{5}$$

In the second equation $15 + 2 = \square$, the children should see that 15 is 10 more than 5; therefore the answer should be 10 more than 7, or 17. With this approach, they should see how the second, and third answers relate to the first one in each frame.

Find the sums.

$$5 + 2 = \boxed{7}$$

$$15 + 2 = \boxed{17}$$

$$25 + 2 = \boxed{27}$$

$$35 + 2 = \boxed{37}$$

$$6 + 3 = \boxed{9}$$

$$16 + 3 = \boxed{19}$$

$$36 + 3 = \boxed{39}$$

$$24 + 3 = \boxed{27}$$

$$54 + 3 = \boxed{57}$$

$$54 + 4 = \boxed{58}$$

$$55 + 4 = \boxed{59}$$

Solve the equations.

$$13 + \boxed{1} = 14$$

$$23 + \boxed{1} = 24$$

$$16 + \boxed{2} = 18$$

$$26 + \boxed{2} = 28$$

$$14 + \boxed{3} = 17$$

$$24 + \boxed{3} = 27$$

$$94 + \boxed{3} = 97$$

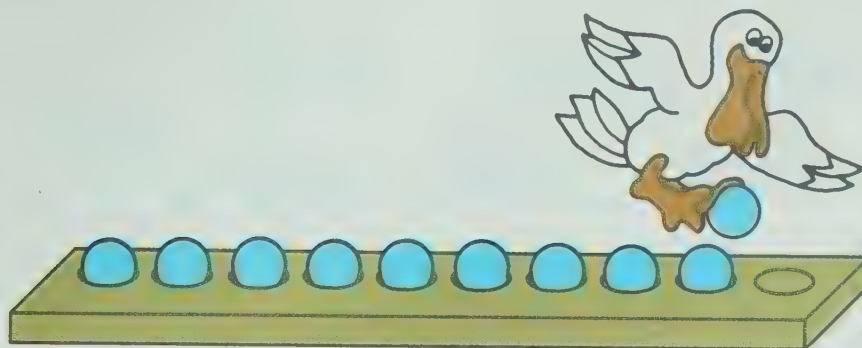
$$53 + \boxed{2} = 55$$

$$73 + \boxed{2} = 75$$

$$43 + \boxed{2} = 45$$

$$94 + \boxed{1} = 95$$

How many different equations for 10 can you write?



$$9 + 1 = 10$$



$$8 + 2 = 10$$



$$7 + 3 = 10$$



$$6 + 4 = 10$$



$$5 + 5 = 10$$



$$4 + 6 = 10$$



$$3 + 7 = 10$$



$$2 + 8 = 10$$

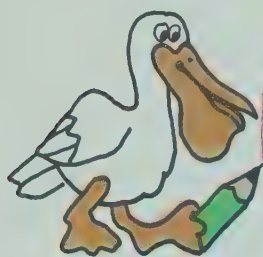


$$1 + 9 = 10$$

Also, $10 + 0 = 10$ and $0 + 10 = 10$.

If the children have difficulty completing any of the problems, suggest that they use their centimeter strips to make "trains" using the combinations suggested and then compare them to the 10-strip.

Which sums are **10** ?



10

1 + 9

4 + 6

8 + 2

4 + 5

2 + 7

6 + 4

4 + 4

9 + 1

6 + 3

5 + 5

10 + 0

2 + 8

Put $>$, $=$, or $<$ in each .

6 + 3 <

6 + 4 =

6 + 5 >

7 + 4 >

7 + 3 =

7 + 2 <

10

Solve the equations.

9 + 1 =

6 + 4 =

7 + 3 =

8 + 2 =

10

Solve the equations. Use number-line jumps.



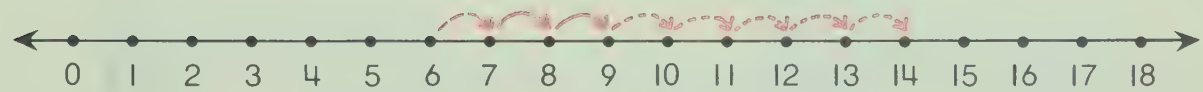
$$5 + 4 + 2 = \boxed{11}$$



$$5 + 3 + 4 = \boxed{12}$$



$$4 + 3 + 6 = \boxed{13}$$



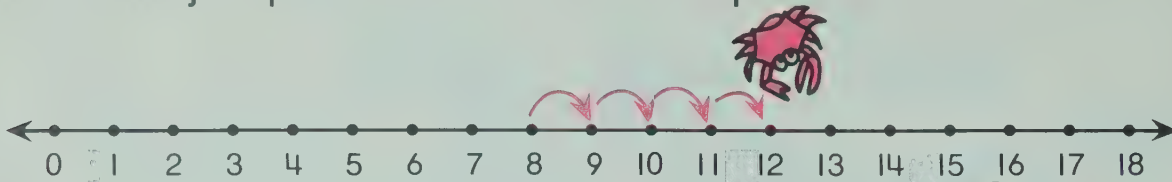
$$6 + 3 + 5 = \boxed{14}$$



$$7 + 1 + 9 = \boxed{17}$$

After the child has had a chance to arbitrarily draw as many jumps on the number line, make sure he has completed the equation correctly.

Draw some jumps. Then solve the equations.



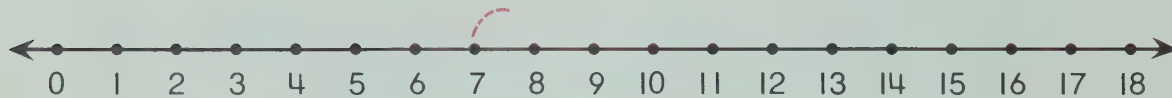
$$8 + 4 = 12$$



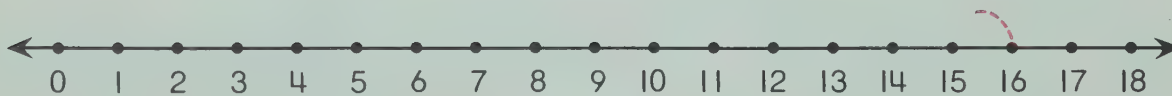
$$9 + \square = \square$$

Number of jumps ↑

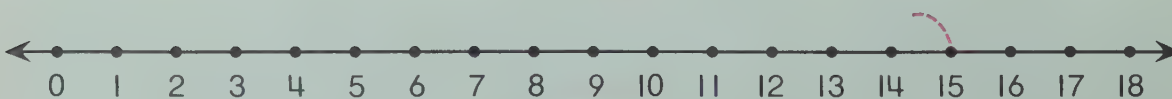
↑ Where jumps ended



$$7 + \square = \square$$

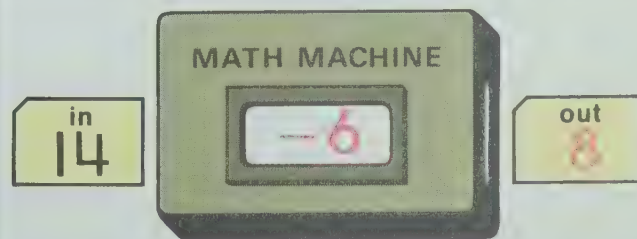
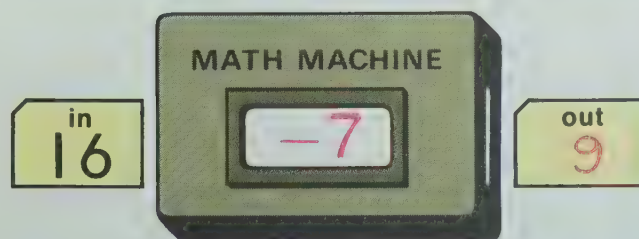
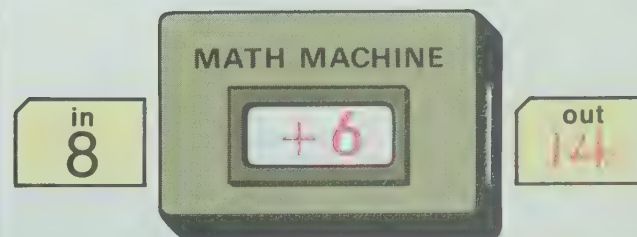
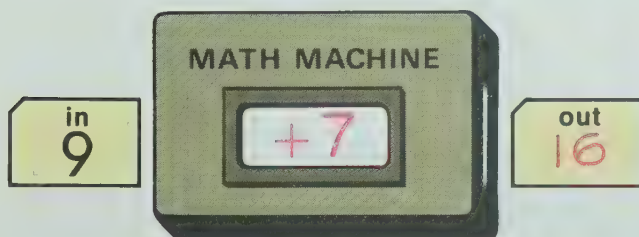
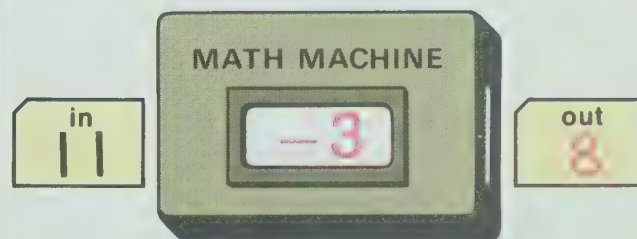
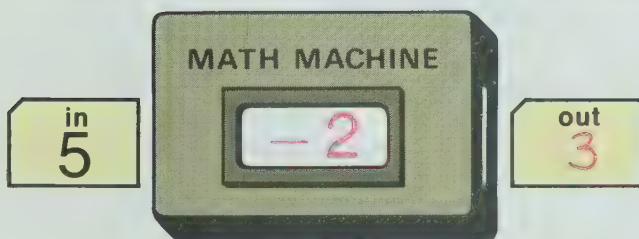
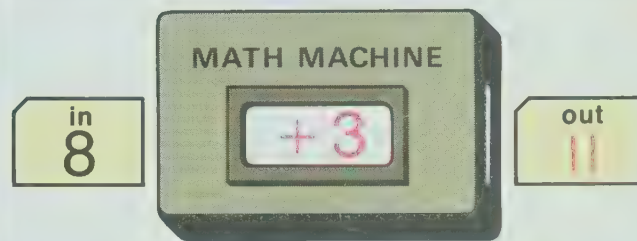
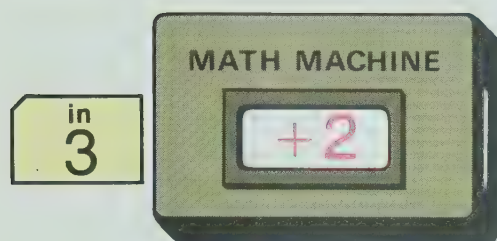
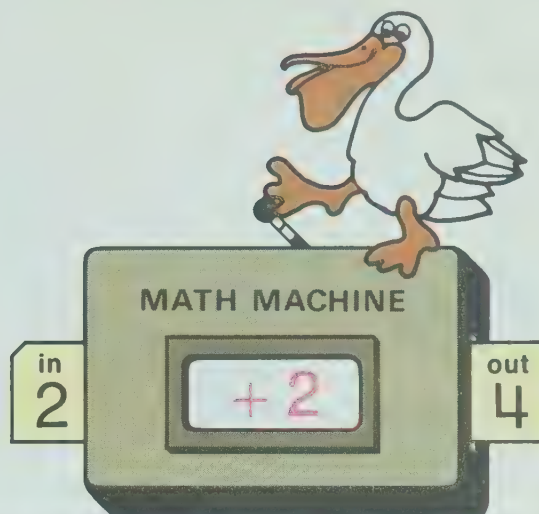
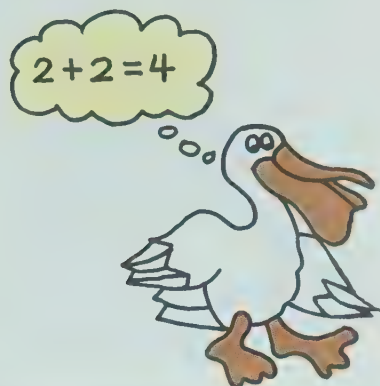


$$16 - \square = \square$$



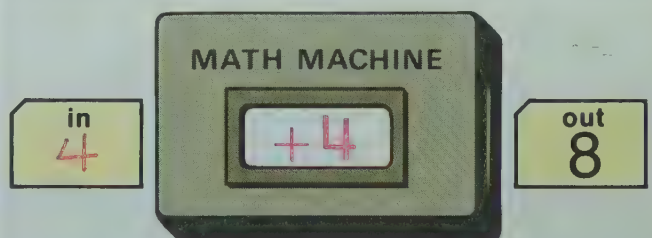
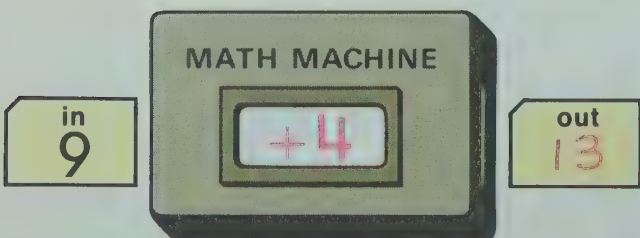
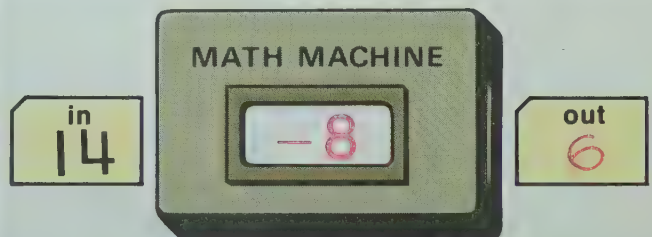
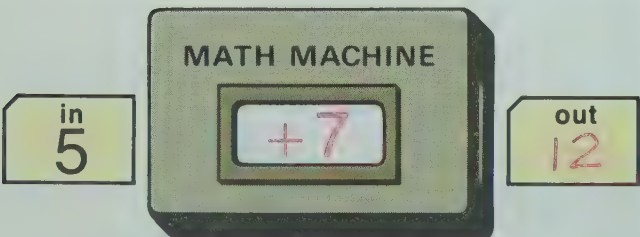
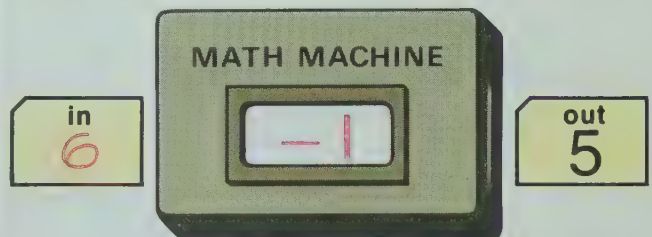
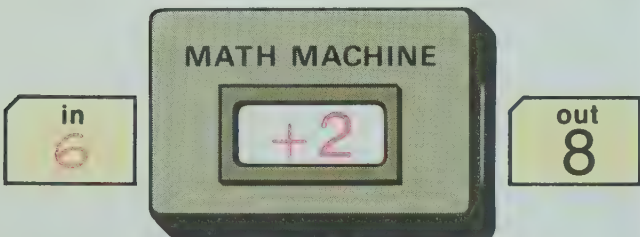
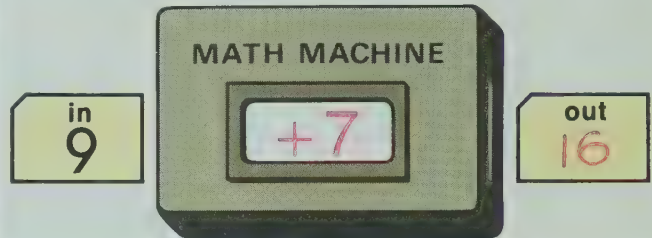
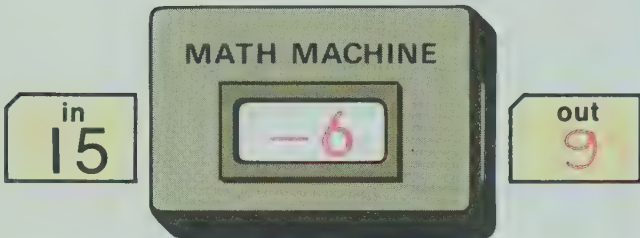
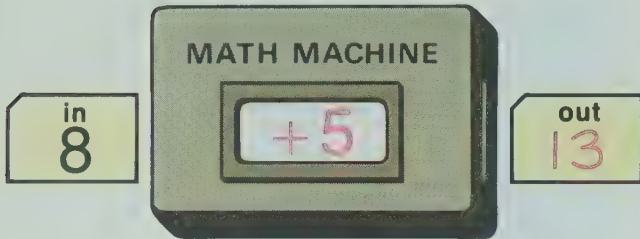
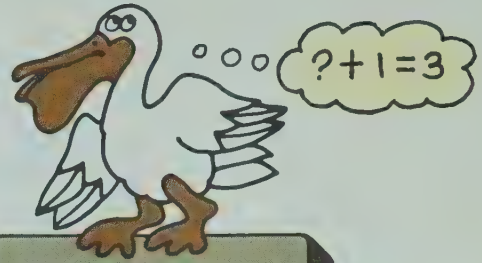
$$15 - \square = \square$$

Complete the "out" cards.



tween numbers. The *in* card corresponds to our thinking of a number. The *out* card corresponds to the result obtained when the function rule is applied. These types of problems are similar to the "Who am I" game.

Complete the cards.



After the children complete the addition table, have a class discussion to include commutativity (diagonal rows upward to the right: for example $2 + 3 = 5$ and $3 + 2 = 5$) and the identity element for addition (first row and first column: the sum of any number and zero is the number itself).

Complete the addition table.

+	0	1	2	3	4	5	6	7	8	9
0	0	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9	10
2	2	3	4	$2+3$ 5	6	7	8	9	10	11
3	3	4	5	6	7	8	9	10	11	12
4	$4+0$ 4	5	6	7	8	9	10	11	12	13
5	5	6	7	8	9	10	11	12	13	14
6	6	7	8	9	10	11	12	13	14	15
7	7	8	9	10	11	12	13	14	15	16
8	8	9	10	11	12	13	14	15	16	17
9	9	10	11	12	13	14	15	16	17	18

Ring these sums in the table:

$1 + 1$

$4 + 4$

$7 + 7$

$2 + 5$

$7 + 3$

$2 + 2$

$5 + 5$

$8 + 8$

$5 + 2$

$8 + 7$

$3 + 3$

$6 + 6$

$9 + 9$

$3 + 7$

$7 + 8$

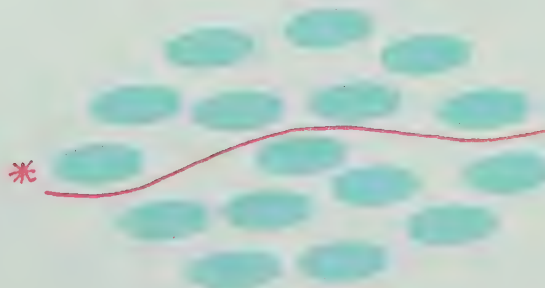
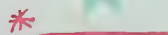
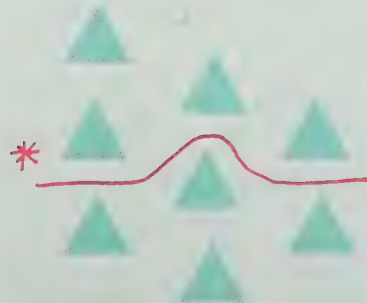
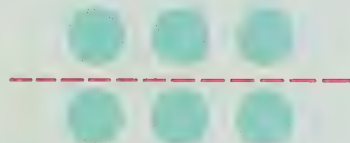
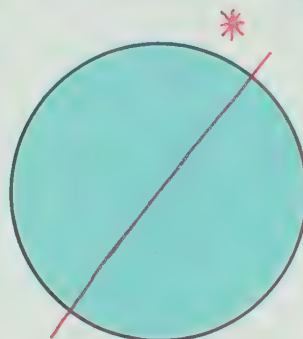
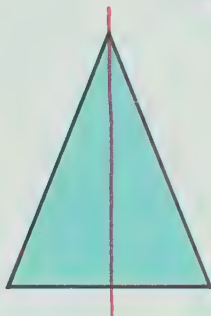
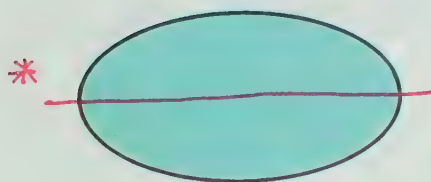
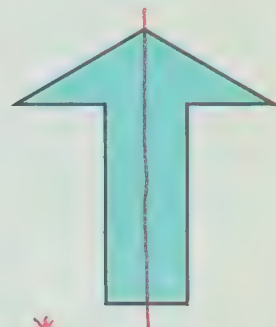
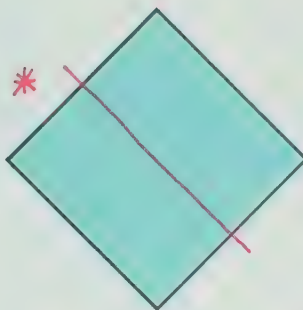
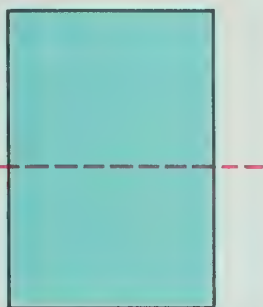
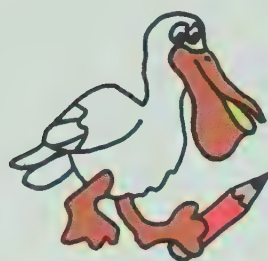
	9	8	7	6	5	4	3	2	1
18	9	10	11	12	13	14	15	16	17
17	8	9 <small>17 - 8</small>	10	11	12	13	14	15	16
16	7	8	9	10	11	12	13	14	15
15	6	7	8	9	10	11	12	13	14
14	5	6	7	8	9	10	11	12	13
13	4	5	6	7	8	9	10	11	12
12	3	4	5	6	7	8 <small>12 - 4</small>	9	10	11
11	2	3	4	5	6	7	8	9	10
10	1	2 <small>10 - 8</small>	3	4	5	6	7	8	9

Draw these lines (—) in the table:

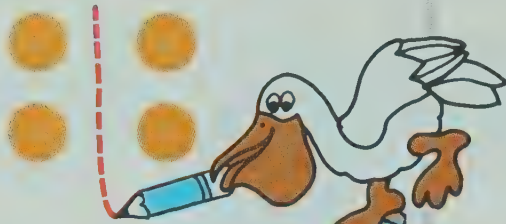
Allow the children to trace each figure at the top on tracing paper, cut it out, and then fold it in such a manner as to think of sharing an equivalent amount of the region (or "candy bar") with a friend. Since there are several ways to

Divide into halves.

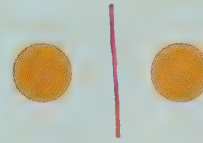
* See Teaching
Commentary.



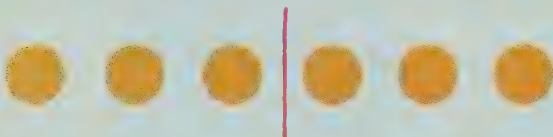
Divide into halves. Then complete the sentence.



One half of **4** is 2.



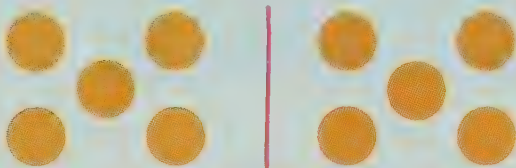
One half of **2** is 1.



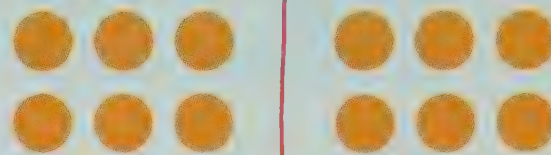
One half of **6** is 3.



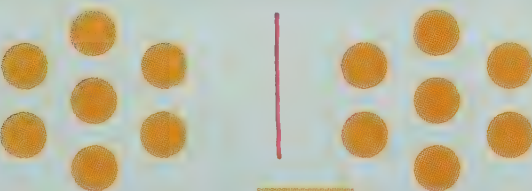
One half of **8** is 4.



One half of **10** is 5.



One half of **12** is 6.



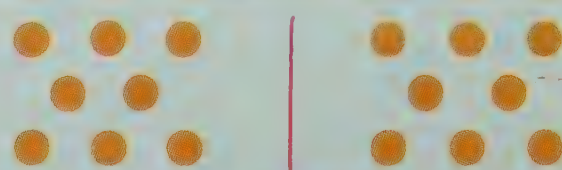
One half of **14** is 7.



One half of **20** is 10.



One half of **18** is 9.



One half of **16** is 8.

Solve the equations.

$$8 + 6 = 10 + \underline{4} = 14$$

$$9 + 3 = 10 + \underline{2} = 12$$

$$8 + 7 = 10 + \underline{5} = 15$$

$$5 + 9 = 10 + \underline{4} = 14$$

$$6 + 9 = 10 + \underline{5} = 15$$

$$9 + 6 = 10 + \underline{5} = 15$$

$$4 + 8 = 10 + \underline{2} = 12$$

$$8 + 5 = 10 + \underline{3} = 13$$

$$8 + 9 = 10 + \underline{7} = 17$$

$$9 + 5 = 10 + \underline{4} = 14$$

$$8 + 4 = 10 + \underline{2} = 12$$

$$9 + 9 = 10 + \underline{8} = 18$$



Solve the equations.

Since $4 + 3 = \boxed{7}$,

I know $14 + 3 = \boxed{17}$.

Since $2 + 5 = \boxed{7}$,

I know $12 + 5 = \boxed{17}$.

Since $6 + 3 = \boxed{9}$,

I know $26 + 3 = \boxed{29}$.

Since $6 + 2 = \boxed{8}$,

I know $16 + 2 = \boxed{18}$.

Since $9 + 2 = \boxed{11}$,

I know $19 + 2 = \boxed{21}$.

Since $3 + 2 = \boxed{5}$,

I know $43 + 2 = \boxed{45}$.

Since $9 + 9 = \boxed{18}$

I know $9 + 8 = \boxed{17}$

Since $9 + 9 = \boxed{18}$

I know $10 + 9 = \boxed{19}$

Since $10 + 10 = \boxed{20}$


I know $10 + 9 = \boxed{19}$

Since $10 + 10 = \boxed{20}$

I know $10 + 11 = \boxed{21}$

The pairs of equations in the top portion of the page involving 10 as an addend and then as a difference will help the children solve the pairs of equations below. If they know the difference for the first equation is 10, they can easily see that the difference for the second equation is either 9 or 11.

Solve the equations.



$10 + 3 = 13$	$10 + 8 = 18$
$13 - 3 = 10$	$18 - 8 = 10$
$10 + 2 = 12$	$10 + 9 = 19$
$12 - 2 = 10$	$19 - 9 = 10$

Since $12 - 2 = 10$,

I know $12 - 3 = 9$.

Since $14 - 4 = 10$,

I know $14 - 5 = 9$.

Since $16 - 6 = 10$,

I know $16 - 7 = 9$.

Since $15 - 5 = 10$,

I know $15 - 6 = 9$.

Since $13 - 3 = 10$,

I know $13 - 2 = 11$.

Since $18 - 8 = 10$,

I know $18 - 9 = 9$.

Find the sums.

5	2	7
3	4	7
8	6	14



6	3	9
2	5	7
8	8	16

1	7	8
8	2	10
9	9	18

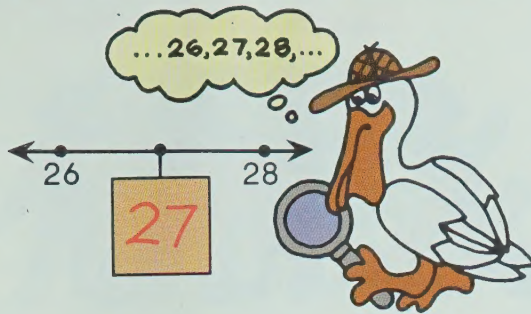
6	4	10
3	2	5
9	6	15

Find the missing numbers.

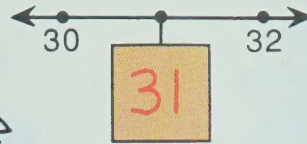
4	2	6
:	7	8
5	9	14

3	2	5
4	6	10
7	8	15

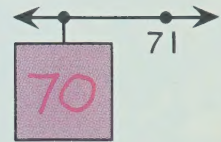
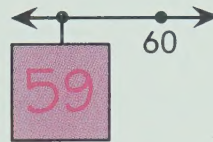
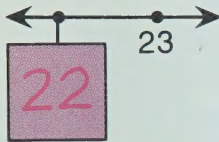
Write the numerals.



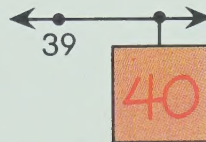
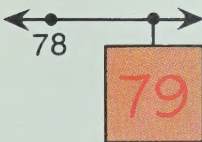
BETWEEN



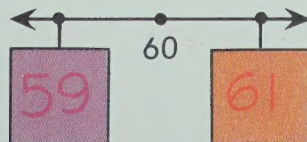
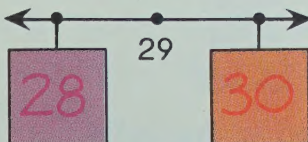
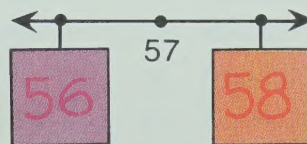
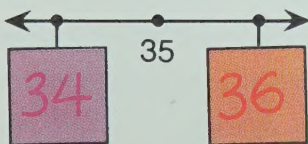
BEFORE



AFTER



BEFORE and AFTER

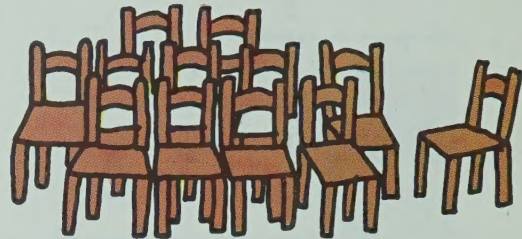


How many in each set? Which has more.
Put $>$, $=$, or $<$ in each

Answers depend on
Classroom situation.



Boys in your class _____ Girls in your class.



Children in your class _____ Chairs in your room



Your weight _____ A friend's weight



Your height in inches _____ A friend's height
in inches



Booklet
page

To follow
text page

UNIT C

Booklet
page

To follow
text page

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